THE ENGINEERING AND MINING JOURNAL

AND

COAL

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THE foreign market for many of our manufactures, more especially for the characteristic products of American ingenuity, though increasing steadily, has never received that attention and cultivation from our manufacturers that it deserves. It is true that in tools and general hardware, in various kinds of machinery, in bridges, in carriages, railroad cars, locomotives, pumps, rock-drills, air-compressors, coal cutting machinery, furnaces, hoisting-engines, and many other articles, we are opening up an important business; but it is as yet in its merest infancy, and can be vastly increased by judicious cultivation. It is at the present time, while our home markets are so active, that manufacturers should commence the work of creating a foreign demand for their goods, so that a few years hence, when our domestic market shall have become over-supplied, they may have an outlet for their surplus.

As an indication of the interest already developing in working up this foreign field, we may refer to the great success of the *Australasian and South American*, under the management of its present proprietors, Messrs. Watson & Mayo. This paper has been greatly improved since its change of ownership, and its immense advertising patronage shows conclusively the benefits that manufacturers find in using it as a means of opening foreign markets. A paper which secures a wide and in large part a gratuitous circulation in foreign countries, wholly in the interest of its advertising, is a new and evidently a successful phase of trade journalism; and as a potent means of fostering American commerce, the *Australasian and South American* merits the success it has attained. That manufacturers of mining machinery, tools, and appliances may also have their interests represented, the *Australasian* has devoted a special department to mining, and has placed it under the management of Mr. Rothwell, one of the editors of this JOURNAL.

THE NEW YORK BOUNDARY SURVEY.

The report of the Regents' Boundary Commission upon the New York and Pennsylvania boundary not only announces the conclusion of an important work, but presents a complete account of it, and of the history leading up to it, from the time of the earliest royal grants. Of the octavo volume of 490 pages containing it, some 460 pages are occupied with the final report of the surveyor, Major H. WADSWORTH CLARKE, of Syracuse, and its interesting appendices.

It was in 1786 and 1787 that the Commissioners of the two States ran the line, as accurately as it could then be done, along the forty-second parallel from the Delaware River to Lake Erie. A preliminary reconnaissance having shown that this line never did perfectly coincide with the parallel named, but certainly varied from it, sometimes to the extent of a thousand feet, and, moreover, that a large number of the old monuments were missing, so that the exact recovery of the old line at al points would be very difficult if not impracticable, the question arose, whether it would not be better to resurvey with the best modern skill and instruments of precision the parallel of latitude originally intended to be the boundary, and to establish as the boundary in future, without regard to the remaining monuments of a hundred years ago, the geodetic line thus determined. The Pennsylvania Commissioners at first favored the idea of a new line, but fortunately better counsels prevailed; the views of the New York Commission were adopted, and the important considerations of long-established usage and cadastral boundaries were not sacrificed to the fanciful advantage of astronomical accuracy. The Joint Commission set itself to work to recover the old line, from the Delaware to the corner with the western meridian boundary—a distance of 226·84 miles. The number of milestones on the old line was 224, the average distance between them being about one per cent over a mile. Of these 224 milestones, 122 were found in place and undisputed; 37 were found removed from their places and in various stages of dilapidation; and the other 65 were entirely missing. Of other monuments known to have been on the line, 11 were found in place, though some of them were broken; 6 were out of place or missing—and doubtless others might be included in this last category, only that the memory, as well as the material of them, has disappeared. It was evidently high time to restore landmarks.

Mr. C. M. GERE, the surveyor on the part of Pennsylvania, having retired from active fieldwork on account of ill-health, a high compliment was paid to Major CLARKE by the request of the Pennsylvania Commissioners that he would act for both States; and the latter half of the work was conducted by him. To him, also, we owe the present exhaustive and valuable report, which, although dated in December, 1885, and transmitted to the Senate with the report of the Commissioners April 22d, 1886, has but recently been published as Senate Document No. 71 of 1886.

In addition to the work on the parallel boundary, the meridian boundary on the west (about 18¾ miles in length) was restored, 51 monuments being set upon it. Of all this work, Major CLARKE gives a complete, clear, and interesting account, tracing, moreover, the history of all negotiations, transactions, and surveys affecting either boundary. In the appendix are numerous curious data and documents, among which we notice a careful *résumé* of the boundaries given to New York and Pennsylvania on ancient maps, interesting accounts of the "Massachusetts claim," the "Connecticut claim in Pennsylvania," the "Connecticut Gore in New York," and the "Erie triangle," and finally complete maps of the restored boundary, showing locations of new monuments throughout. We do not hesitate to say that Major CLARKE, who has skillfully restored and set so many monuments, has, in this final report, added a crowning one to the list—a monument to his own fame. He deserves to be, and we trust he will be, as long remembered as MASON and DIXON.

*

PROFESSOR HOWE'S GREAT WORK ON STEEL MANUFACTURE.

About a year ago, we announced in these pages the preparation of this important work. We now have the pleasure to state that its publication will be commenced in our issue of March 5th, and will be continued from week to week until completed.

This is unquestionably the most exhaustive and valuable treatise on the manufacture, the properties, the treatment, and the applications of

steel that has ever been written in any language, a work which not only reflects the highest credit on its talented author, but is an honor to the entire profession.

The very rapid progress which has been made within recent years in the manufacture and treatment of steel, and in the investigation of the properties of other alloys of iron than those with carbon, and the influence of impurities on the properties of steel, have left all our text-books so far behind that a work intelligently recording our present practice, and collecting and analyzing the scattered information existing in public and private records, has been greatly needed. It is to this task that Professor HOWE has devoted some years of incessant labor, and, aided by the cordial co-operation of the managers of all our steel-works, he has collected a mass of practical information of the very utmost value to every one who either makes, works, or uses steel in any form. Those who are familiar with Professor HOWE's technical writings, and who know his extensive experience as a metallurgist, his indefatigable industry, acute and systematic methods of analysis and high literary attainments, will not be surprised at the exhaustive and systematic manner in which he has treated his subject, or at the claims we unhesitatingly make for it, as the most valuable treatise on steel that has yet been written.

The following partial table of contents of a few chapters of the work will give a good idea of its character.

This treatise will be published exclusively in the ENGINEERING AND MINING JOURNAL, and those who desire to have it should at once notify the publishers, otherwise it will be impossible to supply full sets of the JOURNAL containing it.

CHAPTER II.—CARBON AND IRON. HARDENING, TEMPERING, AND ANNEALING.

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5. The condition of carbon in iron.
6. The distribution of carbon between conditions.
7. The saturation point for carbon.
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Hardening, tempering, and annealing.

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34. Methods and effects. Hardening.
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K.
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O. Résumé.
66. Silicon steel.
67. Effect of silicon on soundness.
68. Effect of silicon on power of hardening.
69. Effect on fusibility and fluidity and resistance to oxidation.
70. Effect on welding.
71. Effect on cast-iron.

THE NEW YORK STOCK EXCHANGE AS A PROMOTER OF MINING BUBBLES.

One would think that the many honorable gentlemen connected with the New York Stock Exchange would not allow the name of this great institution to be used in efforts to float worthless stocks on the public at figures which bear no relation to the value of the properties.

We beg again to call their attention to such enterprises as the Phœnix Mining Company, and the Security Mining and Milling Company, concerning the characters of which full information is abundant and easily obtained. The title of the Phœnix mine is at least doubtful, while the intrinsic value of the property is very small. The property has long been known and has been fully tested by many parties who gave it up as unprofitable. We have no doubt the price Mr. Mack was to pay for it ($10,000), fairly represented its value as a mine.

The President of the Phœnix Mining Co., referring to our remarks last week on his inflated scheme, tells a *Tribune* advertising agent that "the statement that our title to the mine is in dispute or defective is absolutely false." We refer to a letter from the Phœnix Mining Company, which asserts the validity of the title, and flatly contradicts Mr. Mack. We do not undertake to decide this question.

We give on another page a letter from Mr. Mack, not only confirming our statement that the title is in dispute, but giving full particulars of its present status. We repeat, whatever the value of a mine may be, no one should think of purchasing a stock with such a question as to title.

The mine, as we already stated, is a fair prospect only. We are told that some 1600 tons of *selected* ore from it were milled and gave from $6 to $10 a ton; and in the upper tunnel and shafts the vein, greatly broken up, was from two to five feet in thickness, about half of which would have paid to mill. The actual value of the mine is estimated by some gentlemen who are very familiar with it and its past history at much less than $100,000.

Prof. W. P. BLAKE, in a letter on another page, utterly disclaims any such conclusions from his informal report as are given out by those manipulating the stock.

There is another feature affecting the value of this enterprise which should not be lost sight of by would-be investors; the reputations of some of the most prominent parties connected with the floating of this bubble are far from creditable, and even were the mine a good one, which it is not, this should be sufficient to keep prudent investors from touching this stock.

The Security mine, known to ancient history as the Silver Cliff min of Rosita, Colorado, has, through a monotonously disastrous existence, left an extremely ill-savored reputation. The ore is a very low grade, silver-bearing manganese ore, which can be worked cheaply, but, thus far, with only losses for those who have been interested in it.

The Security stock was, we are informed, refused enlistment at the Boston Stock Exchange after full examination, and then it came here, and is being floated under the protection of the New York Stock Exchange and the Consolidated Stock and Petroleum Exchange. The capital stock, which was originally $100,000, is now $10,000,000, the increase having been made, we understand, by two men, one owning $98,000 and the other $2000 of the original $100,000.

The statement the officers of the company make to the Stock and Petroleum Exchange here is composed of "glittering generalities," which should deceive no one.

It speaks of "nearly fifty mines from 70 to 800 feet in depth," of "extensive tunnels in some of these at various levels," and of "a mountain of chloride and manganese carrying silver, thickly impregnated with pockets of horn-silver," and "200,000 tons of milling ore in the dumps, estimated value $1,770,000, besides 500 tons of higher grade ore, estimated value $190,000." "Ore in sight estimated to be of the value of $14,500,000." We are told that this "mountain of chloride," with "pockets of horn-silver," is in "true fissure veins."

We are told "that $813,566 have been expended in surface improvements and $252,404.81" in underground improvements. There is nothing like having these figures down to the odd cent! but—strange omission—there is no statement of the amount of silver produced or the dividends declared by the companies that spent this money in mining in a "mountain of chloride." The whole thing, as stated and as being floated, is an utter humbug (though the mine may have a small value) and it can not fail to bring losses on those who invest in it and discredit on legitimate mining. A correspondent writes us: "The Security is another name for the old Silver Cliff Company, which was an immense fraud."

Can not our Stock Exchanges find any one with technical knowledge to guide them, and have the managers not honesty enough to keep such things off the market, and prevent the injury such schemes do to the interests of legitimate mining?

CORRESPONDENCE.

[We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.]

The Phœnix Mine.

EDITOR ENGINEERING AND MINING JOURNAL:

GENTLEMEN: The Phœnix Mining Company insist that the remarks in your issue of January 23d, and in your editorial of February 12th, concerning the title of this company, are based upon incorrect information, and we shall submit to you the certified copy of the judgment of the Arizona District Court, in the suit of this company against S. F. Mack, by which title of this company is forever established.

In addition, I beg leave to inclose the original report upon the Phœnix mine by Prof. Blake.

When the same has been published, I am sure your readers will at once coincide that the charge of "garbling" Professor Blake's report will be fully and successfully refuted. Yours respectfully,

Feb. 18. N. S. MELDRUM, Secretary.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I have just seen an item from the *Tribune* on the Phœnix gold mine in Arizona, in which my name is used without my knowledge or consent, and in such a way as to make it appear that I indorse substantially the representations now being made regarding that property. This is not so. I have not made any report for the company now owning, or "promoting" the shares. Nearly a year ago, I made an inspection for a gentleman in New York for his own information and not for public use. The paragraph in the *Tribune* consists of partial sentences from the letter reporting that inspection so combined as to produce a much more favorable impression regarding the mine than the whole letter would justify. Placed as this garbled extract is in association with more glowing statements, it is misleading to the public and unjust to me. I am, therefore, forced to protest against this use of my name in support of what I consider extravagant promises and exaggerated valuations. The interests of careful, honest, mining industry, as well as the protection of my own reputation, require this protest, and I hope that the public will clearly understand that I have no connection whatever with the "promotion" of the shares of the Phœnix mine, and that I am thoroughly opposed to the too prevalent system of exaggerated overvaluation of mining properties, and the wholesale floating of shares sustained at unwarranted prices by adroit manipulation aided by the stimulation of the cupidity and credulity of the public.

PRESCOTT, ARIZONA, Feb. 10, 1887. WM. P. BLAKE.

EDITOR ENGINEERING AND MINING JOURNAL:

My attention has been called to an article in the *Stock Holder*, purporting to be signed E. S. Jemison, Pres., in regard to Phœnix mine, in which the following appears:

The statement that "the title to our property is bad is absolutely false and malicious, and without the slightest foundation."

I bought the Phœnix and three other mines adjoining of I. M. Seymour for $10,000. Deeds were made out and forwarded for signature. Money deposited by me as per agreement. I was put in possession by Seymour's representatives. I went to work on the property, and it improved as it was developed. Seymour refusedto carry out the agreement, and commenced suit against me, claiming he owned the property and I was a trespasser. This was tried before Judge Pinney. Decision of the court, specific performance on my part. Seymour must give deed; in case of refusal, court to give deed. Court gave me deed, which is now on record at Phœnix, Arizona. Then suit was commenced against me in the name of Phœnix Mining Co., claiming they owned the property. This was tried before Judge Porter and a jury. Result: I got judgment. My funds being exhausted, I came East to get financial assistance. After I left, a new trial was granted by Judge Barnes, of Tucson. Not being able to employ attorneys at trial, judgment was obtained against me. As the case now stands, I have until next September to appeal to the Supreme Court of the Territory, also the U. S. Supreme Court. I have not surrendered any of my claims, and I intend to appeal. If the opinion of the best mining lawyers on the coast is worth anything, the result is not in doubt. As regards the value of the property, it is a good prospect, worth money, but not millions. All the ore ever worked from the mine was worked at a mill I had charge of (not connected with the property), and my opinion is formed from the results obtained. To those who have, or may invest, in Phœnix mining stock, I leave the question whether their title is perfect. What I have stated is a matter of record. I claim the property belongs to me, and will take all legal means to enforce my claim. S. F. MACK.

ITHACA, N. Y., Feb. 15, 1887.

Phosphorescent Alumina.—Mr. Crookes has communicated a paper to the Royal Society on the phosphorescence of alumina *in vacuo*. In 1879, he showed that ruby (a form of alumina) glowed with a rich red in the electrical vacuum, whatever the natural color of the stone. Recent experiments with a large spectroscope confirm his earlier observations. The spectrum of the light shows a faint and hazy pair of bands and a double crimsom line characteristic of alumina. There are also a pair of fainter orange lines, then a dark space, and after that a continuous spectrum extending to the green. Whether the crimson line is really due to alumina or to impurities does not, however, seem as yet to be beyond all doubt.

Manganese Steel.—Prof. W. F. Barrett has investigated the physical properties of manganese steel, and given his results in a paper to the Royal Society of Dublin. Two wires of No. 10 S. W. G. gauge were drawn for him by the makers of this steel, Messrs. Hadfield & Co., of Sheffield. Their density was 7·808, and one was softened by sudden cooling; the other was kept hard. It is a peculiarity of this steel, which contains from 12 to 14 per cent of manganese, that sudden cooling softens it, whereas slow cooling hardens it. No. 19 wire was found to have an electrical resistance of about 1 ohm per meter. The specific resistance in C. G. S. units was 77,000 for a cubic meter. Ordinary iron is only 9800. Mr. Barrett recommends it for electric light resistance coils. The steel is very slightly magnetic, its susceptibility to induced magnetism being only 300, as compared with 100,000 for iron, hence it is adapted for dynamos, bedplates, and ships' hulls. The tenacity of the hard wire was found to reach 110 tons per square inch, whereas the soft wire had a tenacity of only 48 tons per square inch. The modulus of elasticity was found to be lower than that of wrought-iron, the mean number for the hard manganese wire being 16,800 kilogrammes per square millimeter, while the soft wire had a lower modulus. The modulus for ordinary steel wire is 18,810, and for iron wire 18,610 kilogrammes per square millimeter.—*Engineering.*

THE SCRANTON MEETING OF THE AMERICAN INSTITUTE OF MINING ENGINEERS.

The opening session of the forty-seventh meeting of the American Institute of Mining Engineers took place on Tuesday evening at the rooms of the Young Men's Christian Association in Scranton, Pa. The opening address, on the part of the citizens of Scranton, was made by the Hon. Alfred Hand, who in a bright and witty speech extended to the members the hospitality of the city to all the public institutions, not even excepting the jail. This address was replied to by Mr. James D. Weeks, Vice-President of the Institute, who presided in the absence of the President, Prof. R. H. Richards. The Secretary, Dr. R. W. Raymond, then read a letter of regret from President Richards, who is now in Bermuda on account of his health. This was followed by Dr. Raymond reading a biographical sketch of the late Mr. Martin Coryell, who recently died at Lambertville, Pa., and who was one of the founders and the first Secretary of the Institute. Dr. Persifor Frazer then made some remarks on the progress which had been made in the work of the International Geological Congress at the last session in Berlin, and made an earnest appeal to the members of the Institute to look more thoroughly into the matter, and see that at the next session of the Congress to be held in London in 1888 America be well represented. He also spoke of the desirability that America should promptly take up her allotted quota of the new geological map of Europe, which is about to be issued as the first results of the former sessions of the Congress. Dr. T. Sterry Hunt then spoke a few words, throughout indorsing all the remarks of Dr. Frazer, and in his usual graceful manner bore testimony to the very able way in which the latter has performed the duties of Secretary of the American Committee at the International Congress. The meeting was then adjourned, so that the members could attend the handsome reception prepared for them by the citizens of Scranton. This reception was one of the pleasantest innovations which could have been devised for the opening sessions. The members were all taken in charge by the local committee, and introduced to the ladies and gentlemen of Scranton, who, by their cordiality, made us all feel thoroughly at home. The evening was passed in most pleasant social intercourse, and was followed by a very handsome collation in the upper galleries of the hall.

Wednesday morning, carriages were on hand at headquarters to take the members to the immense establishments of the Lackawanna Iron and Coal Company, including its blast-furnaces, Bessemer works, iron and steel rolling-mills, machine-shops, foundry, and pumping stations. After leaving the works, the members were driven through the city of Scranton, and enabled to see how beautiful its situation and surroundings are. The new electric railway was also visited by many of the members, and by the courtesy of the company, all the details of its workings were fully investigated, and generally pronounced a great success; in fact, to a great many members, the successful development of electricity was very forcibly demonstrated from the peculiarly erratic manner in which their watches have been acting since the visit. The afternoon was passed in visiting the bureau of the State geological survey of Pennsylvania and other points of interest.

The second session of the meeting was called to order at 8 P.M. by Mr. Weeks. The first paper was read by Mr. Frank O. Hill, of Philadelphia, on the "Geology and Mining of the Northern Anthracite Coal-Field of Pennsylvania." This paper was one of very great interest to all members, as explanatory of the section which they were then visiting. The subject was handled most thoroughly by Mr. Hill, to whose efforts, principally, is due the great success of the State Geological Survey in this region. In the discussion which followed, Mr. Charles A. Ashburner corroborated Mr. Hill's remarks on the geological curiosities of this field, and made some remarks on the buried valley of the Wyoming. Dr. Persifor Frazer, of Philadelphia, while speaking on the success of the work done by the State Survey, brought out the fact that all the late maps of the Survey most thoroughly corroborated the large map of the Wyoming District made by Mr. R. P. Rothwell, and that this latter map had virtually been the base on which all subsequent work had been done.

The second paper was one by Messrs. A. S. McCreath and E. V. D'Invilliers, on the "Comparison of Some Southern Cokes and Iron Ores." This paper was of much interest, especially that portion relating to the wonderful deposits of Cripple Creek Valley, Virginia. The figures of the low cost of mining ore in that section were fairly startling, and in the discussion which followed were very strenuously denied by several other members. That ore could any where be mined and carried to water, then washed and carried to furnace, for 75 cents a ton, of washed ore, was a hard statement for the practical members of the Institute to swallow. During the discussion, Dr. R. W. Raymond read a paper on the iron ores in the Chattanooga District, by H. S. Fleming, of Dayton, Ohio, which very fully corroborated the figures presented by Mr. D'Invilliers. The next paper was read by Mr. W. J. Taylor, of Chester, N. Y., on a "Water Cooled Producer." This paper elicited a very animated discussion, in which Mr. E. Harden, of Phœnixville, produced many data from the works of his company. Mr. Mattes made some very interesting remarks on the subject, not not only of using anthracite culm in gas-producers, but also on its use under the steam boilers of the works of the Lackawanna Coal and Iron Company. The general impression seemed to prevail, that, so far, at least, the use of culm as a gas producer was not successful, and would hardly be made so in the near future.

The meeting adjourned then to meet at 9:30 Friday to visit the Pine Brook breaker and the splendid work of the Dickson Manufacturing Co. S.

Mining on the Island of Sardinia.—The mines of Sardinia are, next to agriculture, of the greatest importance as to production and work. In 1884–85, the minerals produced amounted to 148,433 tons, of the value of 14,209,997 lire. The number of workmen employed in the mines was 10,252, showing an increase of 357 over those employed in the previous year. The principal ores raised were iron, lead, and manganese; the iron ore contained 52 per cent of metal, and was valued at 12·25f. per ton f.o.b.; the manganese contained from 30 per cent to 35 per cent of metal, and was valued at 30·35f. a ton.

SAVING OF SULPHUR AND AMMONIA FROM GAS.*

By W. H. Adams, M.E., New York City.

During the years when Americans were most active in investigations of the many substances containing nitrogen or ammonia, namely, from 1869 to 1875, my connection with certain chemical industries led me to experiment in the direction of the recovery of wastes from coal-gases. I take from my notes such memoranda as I think will be of interest, in the hope that some benefit may be derived therefrom by engineers at present attempting to utilize the waste products from coke-oven and blast-furnace gases.

An examination of the conditions governing the manufacture of gas along the Atlantic seaboard, and an intimate knowledge of the mine products used by the different large works, naturally led me at first to consider the well-known foreign methods of concentrating the available soluble salts in a modicum of water. The result was sufficiently promising to warrant a full line of experiments. At that time, no attention seemed to have been paid to the values of "gas liquors." Nearly every gas-works in the United States wasted its wash-water in the sewers.

The nitrogen in bituminous coals varies in quantity from 0·75 to 1·50 per cent of the total weight. In the process of distillation in ordinary gas-retorts, it passes off, partly as free or uncombined nitrogen, partly as ammonium carbonate, cyanide, sulpho-cyanide, chloride, and sulphide—the major part, however, being carbonate.

Liquids, as a rule, absorb gases to a greater extent than solids, the nature of the gas and of the liquid influencing the amount of gas absorbed. Those gases that unite with water to form compounds are absorbed in the largest proportion, as the following table shows:

VOLUMES OF GAS ABSORBED BY ONE VOLUME OF WATER AT 0 DEGREE C.

Hydrogen	0·00193	Carbonic acid	1·79670
Oxygen	0·04114	Ammonia	1180·000
Nitrogen	0·02035	Sulphurous acid	68·610
Carbonic oxide	0·03287	Hydrochloric acid	490·000
Nitrous oxide	1·30520	Sulphureted hydrogen	4·3706

The volume of gas absorbed by a liquid is found to be the same at all pressures; in other words, the weight of the gas absorbed is directly as the pressure.

The relation between the amounts of gas absorbed at different temperatures can not be expressed by any general law. It must be determined by experiment. If two or more gases that do not act upon each other be placed in contact with a liquid each separate gas will be absorbed as if it were the only gas present; but the co-efficient of solubility for each gas differs for every liquid.

Several classes of "washers" and "scrubbers" are used by gas companies: the former, to act mechanically in freeing the gas from tars, etc.; the latter for the removal of ammonia by absorption.

This apparatus is too well known to require explanation here. Average practice with a well-attended plant requires from 4 to 12 gallons of water per ton of coals carbonized—depending upon the quality of the coals. With careful manipulation of the currents, the absorption is very rapid, and the liquor, as it flows continuously from the base of the "scrubber," contains from 8 ounces to 14 ounces of soluble salts per ton, the amount being regulated somewhat by the necessities of the manufacturer, distance of carriage, price obtained, etc. It is well understood that much loss of the volatile substances occurs by agitation in tankage and carriage. The strength is estimated in degrees Twaddle, or by the number of ounces of oil of vitriol required to neutralize a gallon, each degree of Twaddle being equal to about 2 ounces of acid per imperial gallon.

Coals yield from 10 to 45 gallons of 8-ounce liquor (the standard for practical uses), or from 5 to 25 pounds of ammonia sulphate per ton of 2240 pounds.*

In addition to the above, the liquor contains from 200 to 1200 grains of sulphureted hydrogen, rendering it exceedingly offensive in transportation and treatment.†

The practice in our American works, at the time referred to, tended toward large scrubber capacity and unlimited use of water—a loss of revenue from ammonia products of at least 20 cents per ton of coals carbonized, and a deterioration in quality of the gas turned into holders of probably 10 per cent, due to removal of the soluble hydrocarbons, and a further loss in the cost of water uselessly wasted. Recommendations by a few progressive engineers toward the correction of these evils and losses were unheeded for unexplained reasons. To bring the quality of gas up to fair standards, and the recorded production, per ton of coals carbonized, to somewhere near the world's average, necessitated the purchase of exceptionally choice coals at large cost, and in addition the use of high-priced cannel coal—nearly all of which excessive cost was caused by neglect of fundamental principles in gas-making.

It was learned that very high-grade gas-making coals could be purchased at from 10 to 20 per cent lower prices than those paid for the equivalent properties in the clean coals mentioned; but on account of the presence of from 1 to 3 per cent sulphur ("coal-brasses"), such coals remained unsalable until expensive washing apparatus was devised to cleanse them. Naturally, much of the volatile matter was lost by this treatment.

It was easily demonstrable, by very simple changes to accord with existing European plants, that coals containing as high as 6 per cent sulphur could be worked satisfactorily, and that an average high-grade gas-producing coal is rarely found with less than from 1·5 to 2 per cent of sulphur. (I do not speak of exceptional cases, but of the general rule.)

Therefore, after all the data were gathered, we innocently supposed that, on their presentation, the gas companies would be willing to perfect their plant, and, while benefiting themselves by the added quantity, increased quality, and ease of working, with characteristic American generosity would gladly give us a share of the savings in the form of gas-liquor of guaranteed strength. It is sufficient to say that we did not secure any contracts!

In the large way, the utilization of gas-liquor for ammonia may be understood to have been impracticable at that time for the following reasons: (*a*) Owners and managers of large works were without chemical knowledge, as a general thing; their time was almost wholly occupied in extensions and renewals—a branch of the business that paid them well—and it is an established fact that attention to details and small savings must be looked for in a new generation of technical engineers—that is, constructing engineers are rarely good managers of every-day details. (*b*) Transportation to any central location of the liquors made by so many varieties of apparatus and by excessive use of water (say from 1 to 4 ounces per ton of water), was found to be too costly to warrant the necessary expenditure, as also would be the management of independent isolated plants at each gas-works. (*c*) Consumers did not understand the great difference between gas properly and improperly made, or did not assert their rights; and there was no binding statute compelling companies to supply gas of any standard of purity. In proof of this statement, tests of gas were made regularly at widely separated points in five of the largest cities, during the years 1870–74; and less than 10 per cent of those tests showed the gas to be as free from sulphur and ammonia as was required by London standard.

After giving up this idea of utilizing gas-liquor, further experiments were inaugurated for the recovery of sulphur and ammonia, our object being to clearly demonstrate the feasibility of using any of the ordinary mine coals which contained over 7000 cubic feet of gas per ton of 2240 pounds, and which were offered at so low prices as to warrant the belief that the companies would accept that fact alone as sufficient inducement to make the change, thus giving us the very products we most desired, in definite quantities and at a somewhat reduced price.

The continental process of gas-purification by the use of "Laming's mixture" was thoroughly tried with this end in view, but without change of any portion of the plant preceding the purifying-boxes. It is well known that in the foreign works scrubbers are relied on to absorb the maximum amount of ammonia, which is the source of a large revenue, and the "mixture" is relied upon to complete the purifying process by the extraction of the last appreciable ammonia and sulphureted hydrogen.

Laming's mixture has for its base oxide of iron—a substance so cleanly, cheap, and efficient as to have merited a wide use abroad.

It is preferably used in the form of hydrated protoxide of iron, as obtained by treating protosulphate of iron with hydrated lime; is greenish-black in color when made, but in contact with air is converted into sesquioxide—a mixture of protoxide and peroxide. The sulphuric acid and lime combine, forming sulphate of lime, and the mixture is usually prepared with sawdust, to be easily permeable by the gas. It is placed from ten to sixteen inches deep on the trays, and weighs originally about the same as lime.

The gas from the scrubbers yields its traces of ammonia (mostly carbonate), a double decomposition taking place and producing ammonia sulphate and calcium carbonate. The action of the sulphureted hydrogen in the gas, when in contact with the mixture, is appreciably different from that of the lime process alone, the sulphur being deposited at once by chemical changes, in which the hydrogen of a part of the hydrosulphuric acid combines with a part of the oxygen of the sesquioxide, bringing it back to the state of protoxide. The protoxide of iron, in combining with another part of sulphureted hydrogen of the gas, produces iron sulphide, which is hydrated. My early experiments with this mixture, used the same as lime on the trays, but using the scrubbers only so far as needed to rid the gas of tarry matters, gave for first exposure an average of 5000 cubic feet gas, perfectly freed from sulphur, ammonia, and carbonic acid.

The mixture was withdrawn from the boxes, when the gas showed signs of contamination, and found to be of a dirty-black color, due to hydrated sulphide of iron. After contact with the air in heaps, not over two feet deep, for six hours, during which time the reactions due to oxygen brought back the original color, the mixture was replaced in the boxes and purified perfectly about 7000 cubic feet of gas. Repeated revivification and purification followed until about 50,000 cubic feet of gas had been satisfactorily cleansed—more satisfactorily than an average of previous shell-lime working.

The spent oxide was found to contain from 44 to 46 per cent sulphur and from 4 to 6 per cent ammonia sulphate; but these percentages are reached with difficulty unless great care is exercised in handling the mixture from the boxes. The absorption of oxygen is so rapid that if in heaps the mixture will take fire, or become so hot as to volatilize both ammonia and sulphur. Much of the discredit attached to the use of this preparation is no doubt due to carelessness in details of manufacture and handling.

The ammonia salts were washed out in the ordinary manner, but much difficulty was encountered in my first attempts at leaching, occasioned by packing or caking of the heavy substances. This was obviated, however, by the introduction of compressed air or steam through a series of small pipes passed through the staves below the false bottom.

The liquid from the leach-tubs gave irregular products of ammonia sulphate, contaminated with sulphocyanide, leading us to examine various samples from Europe and disclosing the fact that the cheaper grades of sulphate nearly always contained this poisonous product.

Prof. Emile Kopp proposed to treat the lixiviated residue with a boiling solution of lime, strong enough to decompose the cyanide of iron, but not to form any sulphate of lime. After filtration, the clear solution of ferrocyanide of lime is precipitated with a solution of sulphate of potash, which throws down sulphate of lime and leaves ferrocyanide of potassium in solution to be subsequently evaporated and crystallized.

Forty per cent of the sulphur was recovered from the spent oxide mixture, in the form of sulphurous acid gas; but no practical method was then known to do this on a large scale. We had thousands of tons of "smalls" pyrite at our mines that we were unable to use or dispose of, and this spent oxide was more troublesome to burn, gave more dust, and its utilization seemed a harder problem to solve than the working of any ores we had, however fine. Under such circumstances, failure or hesitancy in the erection of a plant to save so rich a sulphur product will be

* A paper read before the American Institute of Mining Engineers, at the Scranton meeting, February, 1887.

* For the variable production of distillates from coals carbonized by gas-works, etc., see any one of the standard works on the subject of gas and gas-making.

† The addition of a small amount of protosulphate of iron to the liquor before distillation will precipitate the sulphur as sulphide of iron, thus rendering the after-process much more satisfactory.

readily understood. But the conditions have been so radically changed by the recent introduction of mechanical appliances that none of our drawbacks need be feared by the present generation.

One might naturally question the value of the spent oxide for the manufacture of sulphuric acid in chambers, objecting to the excess of dust and carbonic acid from the sawdust, etc. The use of the spitzlutte or kindred apparatus will obviate these troubles and produce an exceptionally fine iron paint as the completed product.

A further step was taken to substitute for the bulky Laming mixture a material, the absorption power of which could be definitely known. The varying qualities of the lime in Laming's mixture made this an impossibility for that compound; but the advantage, not to say necessity, of it will be apparent without further remark.

Protosulphate of iron was fused on shallow iron plates (heated from furnace below), and, after yielding part of its water of crystallization, was mixed with dried sawdust in such proportion as to give a light porous sponge—say two parts sawdust to one of salt in bulk. This sponge was used by placing it on the trays of the ordinary purifying-boxes to the depth of from 20 to 24 inches; and its action was so perfect and regular, from the time of turning on the gas until the period of saturation, that too much can not be said in its praise. Its uniform porosity and weight are essential advantages. The exhauster ran with less power and greater regularity; the scrubbers were only required to catch the volatile tars; the sulphur and ammonia were entirely absorbed, and but little carbonic acid gas came over, so that better gas and more of it was passed into the holders. The addition of one lime-tray in the last box was found sufficient to clean the gas from the last trace of carbonic acid.

Taking the data covered by several months' working in a large way, it was found that each bushel of this sponge would purify from 75,000 to 100,000 cubic feet of gas made from the best coals, and that considerable amounts of sulphur—up to 5 per cent—could be handled with ease, the only difference in working of the sponge being the cost of more frequent changes to and from the boxes, a difference remedied by using purifying-boxes of other forms or larger size.

From 45 to 50 cent of sulphur and from 8 to 12 per cent of ammonia sulphate were found in the sponge after saturation.

The ammonia was recovered by leaching, which left the residue in excellent condition for separation from the sawdust and for the manufacture of sulphurous acid gas, paints, etc.; or, if put through a muffle-process, both ammonia and sulphur would be produced at one operation.*

There is now a wide field for operations that would naturally spring from utilizing the wastes of gases other than those formed in gas-making; and the seaboard furnace-plants should be the first to cover this ground.

Experiments were tried, at the suggestion of Professor Silliman, with various combinations of materials that, in his opinion, promised an immunity from cyanogen compounds. I quote from notes sent to me by him:

"Niter-cake is ground to powder and used on the trays of purifying-boxes in similar manner to lime.

"The gas is freed from all its ammoniacal compounds, the salt is enriched by 12 to 13 per cent of ammonia sulphate, and analysis fails to detect appreciable traces of soluble cyanides or sulpho-cyanides.

"We think the cyanogen compounds are decomposed by the salts of iron in the commercial niter-cake, which salts must come from deterioration of your iron retorts by action of the weak acids, with result of a ferro and ferri cyanide of iron in the mass, shown by the distinctly blue stain.

"This is equivalent to a withdrawal of a certain portion of the nitrogen in a passive form, and satisfactorily solves the problem as to disposition of the poisonous cyanogen salts.

"Acid phosphate of lime has also been tried by me in like manner and for like purposes, and so-called superphosphate of lime has been found to withdraw every trace of ammonia from gas.

"Bezelius long ago noted the reaction of monobasic phosphate of lime with the diabasic salt, evolving free ammonia; but how far it may be possible to give stability to ammonia phosphate prepared in this way, yet remains to be seen.

"It is worth knowing that, by using either sodic or potassic bisulphates in a U-tube, it is quite easy to withdraw ammonia from a gaseous mixture containing ammoniacal compounds and to obtain it in a condition to be weighed."

I have only to add that experiments in this direction made by Professor Silliman and Prof. Henry Wurtz over ten years ago are suggestive of wide use now that conditions are so much more favorable.

That all the experiments mentioned have not been elaborated and published, or made the basis of extensive enterprises for the recovery of sulphur and ammonia, and that closely calculating gas managers have not seen the profits to be gained by working coals largely charged with sulphur, cheap in first cost, rich in gaseous properties, ammonia, etc.,* has seemed inexcusable and inexplicable to me throughout the years since the dates referred to, in which I have been myself employed in other directions.

The present improved types of "smalls" burners, which are used in a very large way in Europe and America, were not obtainable in our time of need. They would answer admirably for utilizing the sulphur commercially, and, with any concert of action among the owners of gas-works, the revenue from the use of an absorbent so cheap and effective as the "sponge" last mentioned would be a very important item.

What is true of gas-works in large cities, is also true of the blast-furnace and coke-oven plants. But in all cases, the methods adopted for utilizing these wastes must be carried out cheaply and practically as a part of the entire process and under the one head. The inauguration of a new department, with attendant expenses and clashing ideas, too often is the reason for failure of very worthy processes. This is true, particularly of chemical processes, where the savings are small, constant, and absolute, yet so easily turn to losses in the hands of inexperienced and irresponsible or perhaps prejudiced men.

* See U. S. Patents, Nos. 127,470, and reissue 4968.

* From 1 ton of ordinary gas-coal may be produced 1500 pounds of coke, 20 gallons of ammonia-water, and 140 pounds of coal-tar. By destructive distillation, the coal-tar will yield 69·6 pounds of pitch, 17 pounds of creosote, 14 pounds heavy oils, 9·5 pounds of naphtha yellow, 6·3 pounds naphthaline, 4·75 pounds napthol, 2·25 pounds alizarine, 2·4 pounds solvent naphtha, 1·5 pounds phenol, 1·2 pounds aurine, 1·1 pounds benzine. 1·1 pounds analine, 0·77 pounds toluidine, 0·46 pounds anthracine, and 0·9 pounds toluene. From the latter, is obtained the new substance known as saccharine, which, *Science* says, is 230 times as sweet as the best cane-sugar.

UNITED STATES PRODUCTION OF OPEN-HEARTH STEEL IN 1886.

Our production in 1886 was 245,606 net tons, or 219,291 gross tons, an increase of 96,225 net tons, or 64 per cent, upon the production of 1885, which was 149,381 net tons. The production of 1886 was much the largest in our history. Our largest production of open-hearth steel prior to 1886 was in 1882, when we made 160,542 net tons.

The following table shows the production of open-hearth steel ingots and castings in the United States in the first half and second half of 1886, arranged according to territorial divisions, and the total production compared with the total for 1885:

Open-hearth steel.	1886. Net tons.	1885. Net tons.
New England, New York, and New Jersey	23,382	18,263
Pennsylvania	172,500	94,898
Other States	49,724	36,220
Total	245,606	149,381

The output of open-hearth steel in 1886 was produced by thirty-one old and eight new plants, located in eight States—New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, Ohio, Illinois, and California. Of the new plants one is in Massachusetts, six in Pennsylvania, and one in Ohio. Three open-hearth plants built prior to 1886 were not in operation in that year. At the close of 1886, there were also nine new open-hearth plants which had either been built in that year but not put in operation or were then building or were projected by responsible parties. Of these, five were in Pennsylvania, two in Ohio, and two in Indiana.

Pennsylvania's share of the total production of 1886 was over 70 per cent.

The quantity of open hearth castings produced in 1886 was not materially larger than in previous years, and was relatively very small. The quantity of open-hearth steel rails produced in 1886 by open-hearth works was also very small, amounting to only 5255 net tons, which were made in Pennsylvania and California. Of the whole quantity, 2518 net tons were street rails.

The open-hearth branch of our steel industry has made slow progress during the eighteen years which have elapsed since the first American open-hearth steel was made at the works of Cooper, Hewitt & Co., at Trenton, New Jersey, in December, 1868. But in 1886, the manufacture of open-hearth steel in this country received a very decided impetus, as has been shown above, and the prospect is that it will continue throughout 1887.

Casting Steel Forts.—Sir Henry Bessemer proposes to obviate the enormous expense of ordinary armor-plates for forts by casting *in situ* the whole face of a fort or complete turret in one solid piece of steel, with all its ports and loop-holes properly shaped and formed in the act of casting. He says, "Let us take as a simple example the production of a fort with a curved face 100 feet in length, 16 feet high, and 3 feet in thickness, such a plate would be molded after the manner practiced in ordinary iron foundries, that is, with brick walls held together with iron binders and internally lined with fire-clay. Alongside this mold, would be placed the melting cupolas and four fixed 20-ton Bessemer converters, each capable of turning out eighteen charges per day of twenty-four hours, thus delivering into the mold one ton of molten steel a minute. At this rate of working, the mold would be filled in sixteen hours, and produce a single plate weighing 960 tons, requiring no backing or superstructure for its support, and no expensive fitting together of separate parts. The static pressure in the mold tending to burst it open would, in this system of slowly filling the mold, be extremely small, owing to the fact that the metal will solidify at the lower part, leaving only half a foot or so fluid at the upper part. It will be equally obvious that it would be quite impossible to destroy such masses of steel as could be produced by this method by any existing artillery, while the price which such castings would cost at a time when we can purchase finished steel rails for £3 15s. per ton will be readily understood."

The Donetz Coal-Field, Russia.—A Russian journal has just published an article on the Donetz coal-field. It is stated that the coal formations of the Don Cossacks district occupy a large area in the provinces of Tcherkassy, Donetz, and Mioussy. The richest seams of coal and anthracite are found in the first-named province, on the right bank of the Don, and the trade has been already considerably developed. In 1885, the production of coal was 7,000,000 poods in excess of that of 1884, and the exports showed an increase of 8,271,701 poods. The total number of workmen employed in the Donetz District in 1885 was 7986, of which 6416 worked underground. These were employed 200 days during the year. At the mines, there were 76 steam-engines of an aggregate of 1258 horse-power, while there were 612 horses, of whom 77 were underground. The coal has been employed in locomotives and other steam-engines, manufactories, etc. The average price of anthracite coal was from 7 to 9 copecks per pood at Grouschevka, and from 3½ to 7 copecks, at the other collieries. The Russian government has concluded an arrangement with the firm of H. Hersent & Co., of Paris, for the raising of a sum of 25,000,000 roubles gold, in order to construct the Perecop Canal in the Crimea. M. Louis Coiseau, one of the principal engineers of the Suez Canal, has been appointed to direct the works. The canal will establish a direct route between the Don, the Black Sea, and the Sea of Azoff, and three lines of rail will be brought into junction with it. The strategical importance of the canal will be considerable, but it will also enable the Russians to bring the coal and coke of the Don collieries to the Black Sea ports at low rates, and to undersell the English coal, which at present enjoys almost a monopoly in those ports and at Constantinople.

COMPLETE COMBUSTION AND ECONOMY IN STEAM GENERATION.

The Complete Combustion Company of Boston, a responsible concern, sells boilers, or rather the fire end of boilers, on a guarantee that they will effect an economy in the consumption of fuel of at least 25 per cent over that of the ordinary tubular locomotive boiler, and tests and certificates from reputable purchasers state that this economy has exceeded 50 per cent. These claims and certificates are worthy the attention of all who use fuel, and in their interest we give the following description, with illustrations, of the method of burning coal by which such remarkable results are attained.

The new arrangement consists in burning coal on tubular grate bars, the draft being from the top down through the burning coal, and the gases are burned in a combustion chamber under the grate-bars and in front of the boiler tubes by successive additions of air, as shown in the sectional drawing. The fireplace and combustion-chamber are of peculiar construction and are water-jacketed, the effect of the combined devices being to convert all the carbon of the coal into combustible gases, to burn this gas completely by admitting and mixing air with it at several points, and by bringing those waste gases, carrying with them all the heat generated, into direct contact with the surfaces to be heated.

"The grate tubes are arranged in zig-zag or alternating form, the wide spaces between the upper series of pipes being divided by a lower series, so that a fine mesh is secured without loss of air-space or impediment to draught. Provision is made for expansion, and this grate has never been known to leak. The pipes or tubes connect with the water in the depending leg and the water space forming the front wall of the fire-box, and have a continual rise from inlet to outlet."

The circulation of water through the pipes is rapid and perfect, and as an auxiliary in generating steam, the grate takes first rank. It is more durable than are cast-iron grates when used with an upward draught.

Air is admitted through the fuel doors and passes down through the bed of incandescent coal into the combustion chamber, where, if not all burned, it may find a further supply of air coming through the pipes, as shown in the engravings.

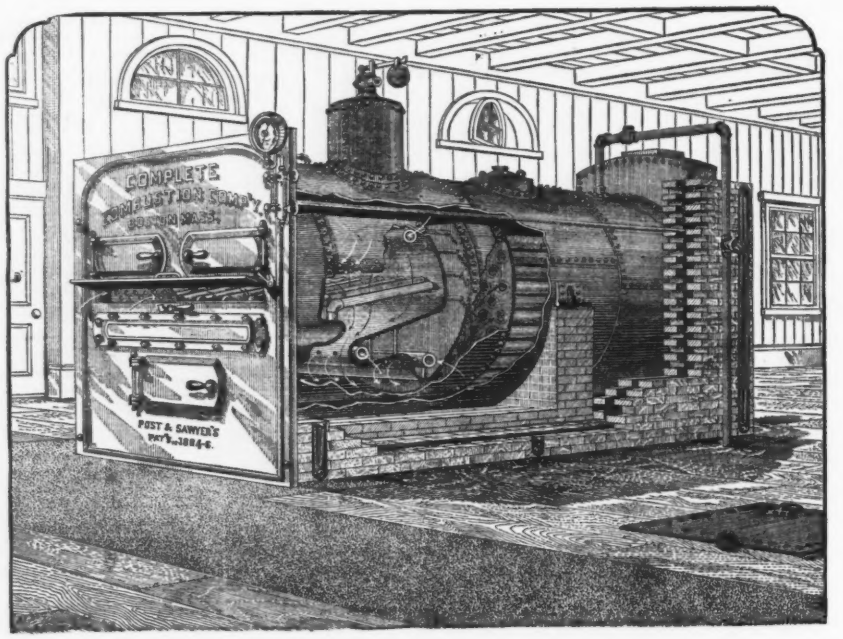
As a consequence of this perfect combustion, the fire is smokeless, and the amount of coal lost unconsumed through the grate-bars is very small.

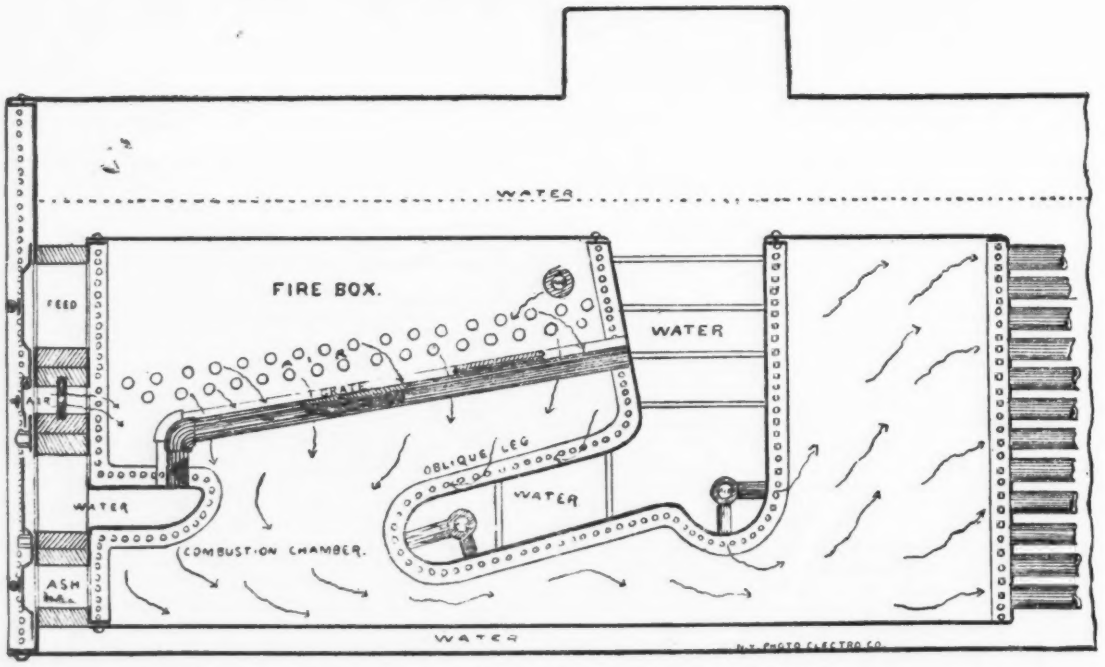
The space at our command will not permit greater detail concerning this device, if, indeed, the illustrations leave any thing further to say, but we make room for the following extracts from a letter, which gives some specific information. Further details can be obtained from the manufacturers, 94 Liberty street, New York.

The Post & Sawyer device can be attached to any ordinary boiler.

"Philip Smith, Esq., Superintendent, made the following test. An ordinary horizontal tubular 50 h. p. boiler has been put in the Atlantic Dye Works, of East Boston, Mass., alongside of one already in use exactly similar in every respect. To the new boiler the Post & Sawyer device (water-leg, grate, and box) was attached. Between the leg and the flue head a wall of fire-brick was built and the caloric current conducted below it and under the boiler and back through the tubes. A comparative test of the boilers was made, lasting five days of ten hours, and designed to show only the relative cost of running the two boilers. The test was made under the personal supervision of Mr. Smith, and he certifies the following result:

	First boiler.	Second boiler, with P. & S. attachments.
Coal consumed per day	11,000 lbs.	4,710 lbs.
Coal consumed in five days	55,000 lbs.	23,550 lbs.
Ashes removed in 24 hours	8 bbls.	¾ bbl.
Percentage of saving		57.19."





THE COMPLETE COMBUSTION COMPANY'S PATENT FIRE-BOX ATTACHMENT.

THE COPPER ORES OF THE SOUTHWEST.*

By Arthur F. Wendt, New York City.

(*Continued from page* 114.)

The largest furnace built of this class measured 36 by 48 inches, and was about 10 feet high, and blown by a No. 4½ Baker blower operated by water-power. No trouble was found in smelting from 25 to 30 tons of ore a day in this furnace. It may be remarked, however, that the ore smelted was of exceptionally good grade, and that all fine ore was carefully screened out. As late as 1883, a large pile of fine ore dating from this smelting still lay in the yard of the smelting-works. The fuel used in these furnaces was entirely charcoal, made largely and preferably from mesquite. Pine charcoal was employed when enough of the other class could not be obtained. Charcoal was hauled as far as 100 miles from the Burro Mountains in New Mexico, before the introduction of coke that could be purchased only after the Southern Pacific Railroad entered the territory.

As might have been expected, the intense heat generated by the burning of coke in the copper-plate furnace proved too great for the copper plates, which were rapidly burnt out after coke fuel came into use; and this eventually led to the abandonment of this furnace and the substitution of the well-known type of copper water-jacket furnace, now used in the Southwest.

The character of the ore treated in 1880 by the Longfellow Mining Company is shown by the following analyses of average samples taken from all the ore put through one of these furnaces daily for five successive days:

Day.	1st.	2d.	3d.	4th.	5th.
Metallic copper.....	23·67	23·93	20·53	21 67	22·53
Silica.....	12·20	11·65	17·30	17 25	13·50
Iron sesquioxide.....	37·40	38·20	29·40	35·91	36·12
Manganese binoxide...	7·24	6·60	8·77	9·10	6·37

No flux of any kind was employed. The ore was self-fluxing and melted very rapidly. The slags made at the same time were carefully sampled, and analyses of the slags are given below for each of the days that the ore was sampled:

Day.	1st.	2d.	3d.	4th.	5th
Oxide of copper.....	0·93	1·10	1·17	1·02	1·50
Metallic copper.....	0·04	0 23	0·15	0·15	0 10
Silica	28·65	31 10	31·30	30 06	28·30
Iron protoxide.....	56·13	53·30	51·93	53·36	55 38
Manganese protoxide..	7·40	.....	... .	11·10	.....

Considering the poor character of the fuel employed and the rapid concentration in one operation of the copper in the ore into a bullion averaging 95 per cent of copper, the slag, although containing considerable copper, can not be considered as carrying an excessive amount.

Figs. 12, 13, 14, and 15 are sections, plans, and elevations of the water-jacket furnaces as they are now generally employed in the West for the smelting of oxidized and other copper ores. They had as prototypes the furnaces used in the Detroit and other copper-works, smelting slag from the treatment of native copper from Lake Superior.

They consist simply of a casing *B*, with an outer and inner shell of iron, between which water freely circulates. Some 25 to 30 gallons of water are required per minute for this purpose. The inlet of the water is through the pipes *F*; the outlet is through *G*. Hand-holes *E*, in the bottom of this space, are arranged to permit ready access for cleaning. Most Western water contains lime, and the water-space of the water-jacket scales almost as rapidly as a boiler, thus making these hand-holes imperative. The blast is carried around the furnace in the circular casing *C*, and enters through the tuyeres *D*. Opposite each tuyere, there is a hand-hole (and an eye-hole) in this casing, which permits ready access to the interior of the furnace. The outer shell of the furnace is continued down some distance below the water-jacket, and there forms the casing of the crucible. This outer casing, by the way, as made by manufacturers of mining machinery, is invariably too short; and a piece must be riveted on to it to give the necessary depth of crucible. As built in the shops, there is not depth sufficient in the crucible to permit the proper separation of copper and slag. The interior of the crucible is lined with fire-brick and clay *M*. This clay bottom of the crucible rests on the hinged iron doors *P*, which can be dropped at any moment, when the furnace is blown out, to remove accretions in the crucible or for any other purpose. The slag lip *L*, attached to the shell of the furnace, carries off the cinder. The tapping-notch *O* is used for tapping the metal produced. The whole furnace stands on four iron pillars *R*, and is covered by the hood *H* leading to the stack *K*. The hood *H* has a charging-door cut in it. The level of the charge is generally kept a foot below the bottom of this charging-door.

A furnace of this class, 42 inches in diameter at the tuyeres, and 9 feet high, driven by a No. 4½ Baker blower, run from 100 to 120 revolutions per minute, will readily smelt 40 tons of ore per day. With an increased amount of blast, an average of 50 tons has been smelted in these furnaces, and even 60 tons have been put through; but the experience at Globe and elsewhere has proved that this forced rate of smelting leads to an increased loss of copper in the slag, and is not economical. Excellent smelting can be done in these furnaces, when the rate of smelting is not pushed much above 40 tons a day. The charging of these furnaces is done, like that of an iron furnace, in horizontal layers, charges of coke, ore, and the necessary fluxes alternating in regular order.

The consumption of fuel varies somewhat, of course, with the nature of the ore smelted and the character of the fuel. The best fuel used in the Southwest is what is known as patent English coke, from Cardiff, Wales, where the coke is made from the best washed coal. It is very hard and resonant, and contains about 11 per cent of ash. Next to this coke in value is the Connellsville, and the least valuable is that made from the Cretaceous and Tertiary coals of Colorado and New Mexico. The consumption of fuel, depending on the character of coke used and ore treated, varies from 15 to 20 per cent. There seems to be no saving in fuel by increasing the rate of smelting in a 42-inch furnace beyond 40 tons a day; but a small saving of fuel has been found in using larger furnaces built on the Raschette principle, of which more anon.

In the summer of 1883, the basic ores of the Longfellow mines and siliceous ores of the Metcalf and Queen were treated at the works of the Arizona Copper Company. In two months' time, 2140 tons of copper ore were treated, requiring the addition of the following fluxes: iron ore, 410 tons; limestone, 740 tons. There were also smelted 410 tons of foul slag, and the total coke consumed amounted to about 500 tons. The average yield of the ores was 12½ per cent of copper, and the average of the whole charge a little over 7 per cent. The consumption of coke was 177 pounds for 100 pounds of copper produced.

In the winter of 1883 and spring of 1884, the Arizona Copper Company built its present large smelting-plant. It consists of five round furnaces, blown by five Baker blowers, operated by water-power or a compound Corliss steam-engine, as desired. Above the smelting-furnaces there is a series of ore-, flux-, and coke-pockets, which are filled from the dump-cars run over them on the overhead railway tracks. The plant is much larger than was warranted by the capacity of the mines; and the cost has been very great. The cost of grading alone, for the ore-pockets, smelting-plant, and approaches, was in the vicinity of $100,000.

The Detroit Copper Company, now located at Morenci, near the Longfellow mines, began smelting in round water-jacket furnaces several years ago, at a point on the San Francisco River, some two miles down the stream from Clifton. They there erected a dam across the river and utilized the water-power, hauling the ores from their mines near the Longfellow. In 1884, this company, after mature deliberation, decided to change the location of its works and erect them at the mines, connecting them with the Coronado narrow-gauge system, thus saving the hauling of all the ore. As it takes only one ton of coke to smelt, say, 6 tons of ore, the mines become the natural place for smelting operations, other things being equal. The drawback to the location of the smelter at Morenci was the entire absence of water at that point. The novel proposition was made, and has been successfully carried out, to pump water from the San Francisco River for a distance of seven miles, and against an elevation of 1700 feet, to the proposed location of the smelting-plant. The pump is operated at the San Francisco River by the power of the river, derived from throwing a dam across the stream. The line of pipe is 4 inches in internal diameter, and the lower portion of it is made of what is known as oil-line pipe, capable of standing a pressure of over one thousand pounds to the square inch. In the building of the smelter, improvements were introduced, which now represent the most advanced practice in the Southwest. Instead of depending on a number of small round furnaces, a rectangular furnace, 32 inches wide and 72 inches long, was erected.

The character of ore smelted in this furnace is entirely similar to that smelted in the furnaces of the Arizona works.

The following is an average analysis of the slags made in this furnace in the winter of 1885:

SiO_2.....	29 50
FeO.....	37·08
Al_2O_3.....	14 07
CaO.....	9·02
MgO.....	7·44
MnO	1·13
Cu.....	1·82
S.	0·30
	100 36

The capacity of this Raschette furnace is about 60 tons per day, and a saving of about 10 per cent of the fuel above that used in the operation of round furnaces has been noted. It requires no more men to operate this furnace, and on the whole, there should be a decided saving in the cost of the treatment of ores as compared with the smaller round furnaces. At the rates ruling for labor and fuel in the Clifton District, the cost of treating ore in this furnace is about $8 a ton.

The production of copper in the Clifton District is at present about 11,000,000 pounds per annum, of which quantity the Arizona Copper Company produces about 7,000,000 pounds and the Detroit Copper Company the remainder. The copper from this camp was the first in the market, and is the one which has made Arizona copper best known for its fine qualities. Containing neither arsenic, antimony, nor silver, the metal is for most purposes the equal, and for some, the superior, of Lake copper.

THE BISBEE COPPER DISTRICT.

The second copper district to become productive in the Southwest was the Warren District, better known as the Bisbee mining camp, located in the Mule Pass Mountain, in Cochise County, Southern Arizona. The mines are about eight miles north of the boundary line between Arizona and the State of Sonora, Mexico. They were originally discovered by Henry Warren, after whom the mining district is named; but it was not till 1879 that any work of moment was done on the claims.

In the autumn of 1880 the first water-jacket furnace erected in Arizona was put up at the now well-known Copper Queen mine of this district, and at once commenced producing. From that day to this, the mine has maintained a phenomenal output; and the present indications are that the yield of this camp will continue for many years to come. The ore smelted in 1880 yielded 25 per cent of copper. Since then, the percentage of the ore has gradually fallen, until now, when the proportion of metal in the ore smelted is often less, and rarely more, than 10 per cent.

The principal mines of the Warren District are found in limestone of the Lower Carboniferous age, as determined by the presence of spirifers and corals. The Mule Pass Mountains are a short east-and-west range, produced by the upheaval of the Lower Carboniferous limestone, which overlies a huge mass of eruptive rock. The top of the anticlinal axis formed by the upheaval has since been eroded, and an irregular mountain of eruptive rock now takes its place. Both on the north and south contact of the eruptive rock with the bedded limestone, cañons have been formed by erosion; and it is in the southerly cañon that the Copper Queen and other large producing mines are found.

Fig. 18 illustrates the character of deposition of ores in these mines. The limestone forms the south slope, and the eruptive rock the north slope of the cañon. In the deep workings of the Queen mine, on the 400-foot level, the top of a mass of eruptive rock has been found, which has been microscopically determined by Dr. A. Julien to be a felsite porphyry. Dr. Julien says:

"The felsite porphyry consists of large crystalline grains of quartz and

* Abridged from a paper read at the Bethlehem Meeting of the American Institute of Mining Engineers, May, 1886.

orthoclase in a fine felsitic ground-mass. The quartz incloses numerous grains and globules of glass and stony matter, sometimes with a fixed bubble; also particles of orthoclase and a few colorless needles. In places along the hexagonal outlines of the quartz grains, tongues of stony matter project into the crystals from the neighboring ground-mass and even entirely across them, a common occurrence in an eruptive rock. The Sanidin (orthoclase) grains present less regular outlines than those of the quartz, and have been generally rendered milky white by kaolinic alteration. The ground-mass consists mainly of a fine granular intermixture of quartz and feldspar, the latter clear or in a cloudy state, together with a small quantity of pyrite in minute particles and films of brownish-yellow ochre. The microscope discloses the marked presence of fluid structure. A little hornblende is present in dark greenish-gray granules of fibrous texture. Pyrite is generally distributed in cubical or aggregated crystalline grains of some size through the fine granular structure. This rock is undoubtedly eruptive."

Section across Bisbee Cañon, showing Bodies of Ore in Limestone.

In this district, as in the Clifton District, a distinction can be made between veins and ores found in the limestone and those in the siliceous or eruptive rocks. The ores of the latter are siliceous, and within a few feet of the surface change into copper glance and at greater depth into pyrites; the ores of the former are oxidized; and, although a depth of over 400 feet has been reached below the surface in the Queen mine, at Bisbee, no trace of sulphur has yet been discovered.

The copper ores in Warren District all occur in true fissures; and the two principal producing mines of the district, the Copper Queen and the Copper Prince, present great similarities and in every particular carry out the description of "bed-veins" given by Cotta. The outcrop of the ore starts between the bedding of the limestone; and, as Cotta remarks, the ore-bodies might be mistaken for ore-beds and not bed-veins, were it not for the presence of spurs into the walls.

Fig. 18 illustrates this structure. The spurs in these ore-deposits usually follow the planes of bedding of the limestone. The limestone generally occurs in blocks, and the ore then follows the plane of bedding until it comes to a cross seam from one bed to the other, when the ore will sometimes jump to the next seam. In places, these seams are several inches or even a foot wide, and completely surround blocks of limestone; and the vein then assumes the character of a stockwerk. In other places, what have evidently been vugs and caves in the bedded limestone have been filled by the ore. Not all of the caves near the ore-bodies contain ore. A notable one, east of and near the big Copper Queen ore-body, has perfectly smooth and rounded water-worn sides; and in the bottom of this cavity round boulders, gravel, and sand of limestone and quartz are found, as if this cavity had formerly been the seat of intense geyser action and the materials now lying in the bottom of the cave were formerly violently churned in it. To those who have studied the deposition of ores in this district, there can be no doubt that there is some relation between the existence of these cavities in the limestone and the deposition of the ore. When the Copper Queen was first opened, a horizontal drift and open cut was run in on the bedding of the limestone, following the outcrop of the copper ore. Only a little way in, the ore began to rise, and the work eventually formed what is now the great open cut of the Copper Queen mine. Formerly, no doubt, a huge cave occupied this place, the bottom and sides of which were gradually covered with ore. From the roof of this cave, stalactites of carbonate of lime were dependent; and in parts of the cave these stalactites contained not only carbonate of lime but carbonate of copper as well, the ore occurring in the shape of a series of concentric rings, the carbonate of lime always finally covering the copper ore. Here, then, we must have had a successive series of changes in the deposition of ore and carbonate of lime from the roof of the cave.

The deposition of copper from a liquid is rarely shown as completely as in the principal copper mines of this district, and it seems to have been accompanied at the same time by a deposition, in the adjacent country-rock, which now forms the walls of the veins, of both silica and alumina, and more or less copper. At one point in the Copper Queen, some 200 feet below the surface, the walls of the Great Queen ore-body are very well defined, perfectly smooth and separated from the hanging-wall by a clay gouge, some two inches in thickness. The clay gouge readily flakes off from the smooth hanging-wall, and the wall itself is decolorized and stained almost black. Samples taken from this wall carried 1 per cent of copper, and considerable iron, alumina, and silica.

(TO BE CONTINUED.)

Electric Light and Vegetation.—It is said that at Davenport, Ia., the light from an electric-lamp tower falls upon a flower garden about 160 feet away, and during last summer the owner observed that lilies that usually bloom in the day opened in the night, and that morning-glories unclosed their blossoms as soon as the electric light fell upon them. It has frequently been observed that trees were most exuberant in their foliage on the side nearest the electric light.

New Method of Tempering Steel.—The Louisville, Ky., *Courier-Journal* has published reports of tests made in the presence of one of its staff of a new process for hardening and tempering steel. A drill made of new steel penetrated in forty minutes a steel safe plate warranted to resist any burglar drill for twelve hours. A penknife tempered by the process cut the stem of a steel key readily, and with the same blade the inventor shaved the hairs on his arm. A number of other interesting and successful tests were made. The inventor is a young blacksmith, who has been experimenting with the process for years, and who claims that the tempering is done without expense or skilled labor. He has also a new process for converting iron into steel at small expense. He claims to be able to make steel plates so elastic and hard as to turn a ball fired from the heaviest gun ever constructed. The invention is a secret, not having been patented, and a company has been incorporated to push it.

The Inventor of Saccharin.—Prof. Ira Remsen, in a letter to the New York *Times*, says: The substance which has come into prominence of late under the name saccharin was discovered in the laboratory of the Johns Hopkins University under the following circumstances: Fahlberg was working here about six or seven years ago as an advanced student. At his request I assigned a problem to him for original investigation. This investigation he afterward carried on under my guidance. When the work was completed I wrote an article giving an account of the results obtained, and published it in the "Report of the German Chemical Society," placing Fahlberg's name with mine at the head of the article. Afterward I published a fuller account of the investigation in the *American Chemical Journal*, again crediting Fahlberg with his share of the work by placing his name with mine at the head of the article. In other articles the now famous sweet substance known as benzoic sulphinide was fully described and its marked sweetness commented upon. Soon after this Fahlberg left the laboratory and, as it now appears, has occupied himself to some extent with the further investigation of the sulphinide. This he did without consulting me. He has also taken out patents covering the methods of preparation, which we first made use of here, and has not consulted with me in regard to this. In all his statements regarding the substance in question he strives to make the impression that the discovery is his, and in most references to it in print he is given sole credit. I think it is time that I protest in the interest of truth and justice. Fahlberg carried out my directions and deserves credit for this, and for this alone. He did not make the discovery and would never have made it if he had been left to his own resources. I have nothing to say regarding the probable success of this "new industry (?)" save this, that I do not believe that the substance can yet be made cheaply enough to make it a successful rival of sugar. It is possible that the time may come when this can be done, but it is probably far distant. The headlines of your letter are highly misleading. Sugar has not been made from coal tar. The sulphinide belongs to an entirely new class of compounds which are now under investigation in this laboratory. Some of the other members of the class are sweet, while some are intensely bitter. One is sweet, and bitter-sweet when applied to the tip of the tongue, and bitter when applied to the base of the tongue. These substances have nothing in common with sugar except the sweet taste.

Finally, other sweet substances beside the sulphinides have been made from coal tar, and have long been known, but the world has not been excited over them, and there is, in my opinion, no occasion for getting excited over this latest example of the kind. Coal tar furnishes not only sweet substances, but substances of a great variety of odors and colors; or, it is more correct to say, that from coal tar substances are made which in the laboratory can be converted into a host of compounds, sweet, sour, odoriferous, and colored. IRA REMSEN.

JOHNS HOPKINS UNIVERSITY, BALTIMORE, Monday, Feb. 14, 1887.

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and for that of book-buyers, give the retail price? These notices do not supersede review in another part of the Journal.]

TREASURY DEPARTMENT. *Annual Reports and Statements of the Chief of the Bureau of Statistics on the Commerce and Navigation of the United States* for the Fiscal Year ending June 30, 1886. Part I.: Foreign Commerce, Immigration, and Tonnage. Washington: Government Printing-Office. 1887. 8vo, pages CXV + 938.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent-Office.

GRANTED FEBRUARY 8TH, 1887.

357,186. Machine for Bending and Upsetting Metal. Henri F. Dosme-Chatain and Antoine Guibert, St. Amand, France.
357,187. Machine for Shearing and Bending Sheet-Metal. Andrew J. Duncan, Pittsburg, Pa.
357,193. Gas-Motor. William Gavillet and Louis Martarescne, Paris, France.
357,214. Stone-Cutting Saw. James W. Maloy, Somerville, Assignor to the American Marble Company, Boston, Mass.
357,286. Feeder for Ingot Molds. George Nimmo, Newark, New Jersey.
357,303. Manufacture of Molds for Casting. Ralph Bagaley, Pittsburg, Pa.
357,367. Float or Ponton for carrying Lines of Pipe for Dredging Purposes. Ephraim Chaquette, San Francisco, Cal.
357,369. Ore-Pulverizer. Nelson Clement, Chicago, Ill.
357,391. Air-Feeding Device for Furnaces. Thomas W. Jenkins, Philadelphia, Pa.
357,434. Pulverizing-Machine. John B. Waring, New York City.
357,435. Feeder for Pulverizing Machines. John B. Waring, New York City.
357,447. Reheating-Furnace for Sheet-Iron or Steel. William H. Bailey, Pittsburg, Pa., Assignor of one half to Richard Morgan, same place.
357,456. Kiln for Roasting Ores. Howard H. Burden, Troy, N. Y.
357,520. Derrick for Use on Dredging Machines. William Butler, Jr., and William H. Clarke, Lockport, N. Y.
357,528. Process of Concentrating Sulphuric Acid. J. B. F. Herreshoff, Brooklyn, N. Y., Assignor to himself, George H. Nichols, and William H. Nichols, all of same place.

REISSUE.

10,805. Roller-Bearing for Shaft and Axles. John Gibbons, West Troy, N. Y., Assignor to the Meneely Hardware Company, same place.

PERSONALS.

Dr. F. V. Hayden, long known as director of the U. S. geological and geographical survey of the territories, has resigned his position.

Mr. A. F. Wuensch, the editor of the Mining Department of the *Herald-Democrat*, of Leadville, Colo., has been compelled by the press of private interests to resign his position, and has been succeeded by Mr. John M. Whiton.

Prof. William P. Blake and his son Francis H. Blake, the engineers under whose superintendence the preliminary work on the Hassayampa dam, Arizona, has been done, have completed their work, and will now direct their attention to other mining operations. Professor Blake returns East within a month.

Mr. E. C. Hegeler, of Matthiessen & Hegeler, La Salle, Ill., has established a new philosophical and scientific journal at Chicago, *The Open Court*. He has engaged Mr. B. F. Underwood, lately of *The Index*, of Boston, as editor. Dr. Paul Carus has been retained to conduct personal correspondence with prominent European savants, and to reproduce and review in the paper the latest productions of European minds.

We regret to learn from a telegram from Salt Lake City, of the sudden death there, at the age of fifty-two years, of Mr. William Br□ckner, the inventor of the roasting and chloridizing cylinder that bears his name. Mr. Br□ckner was educated at the University of Göttingen, and subsequently studied at the mining school in Freiberg, in Saxony. His first position, immediately following his graduation at Freiberg, was in Bolivia. He spent eight years altogether in South America, filling positions. In 1864, he came to this country, which he made his head-quarters, his work being mainly in the mining regions of the West and in Mexico. His roasting-furnace was first introduced in Colorado. He made occasional trips to Germany, where he successfully introduced his Kugelm□hle, or ball pulverizer, which never found much favor in this country. Mr. Br□ckner was a man of sound and thorough knowledge, of sterling honesty, and of great nventive ability. He was deficient in business sagacity, and, it is said, was not successful in making money by his inventions.

FURNACE, MILL, AND FACTORY.

Messrs. Nabers, Nonon & Vaughan will erect soon a mineral paint factory at Birmingham, Ala.

The Fairchance Furnace Company, Fairchance, Pa. has begun work on the new furnace.

The capital stock of the Excelsior Steel Furnace Company, Chicago, Ill., has been increased from $2,500 to $10,000.

Reports state that Eastern capitalists, will erect at Pittsburgh, Pa., on a large scale new Bessemer steel works and a rail mill.

The United States Tack and Nail Company has been organized at East St. Louis, Ill., with a capital stock of $100,000 ; incorporators, L. W. Tatum, E. J. Bagnall and G. M. Saul.

At the convention of iron roof-makers, held at Canton, Ohio, an agreement was made to not sell below a fixed price, and hereafter roofing will be sold by the square measure, instead of by the pound.

The lease of the Woods Iron Plant at Wheatland, Pa., has been confirmed, the plant is being repaired by Pittsburg capitalists, and will be converted into a mill for the manufacture of sheet-iron.

The Alabama Artificial Stone and Brick Company has been organized at Birmingham, Ala., to utilize the patent of one J. W. Galley, of Texas. It will probably take furnace slag for its principal material.

The Roller Chain Belting Company, of Columbus, Ohio, reports a good business, running full, and has orders ahead to keep it busy for some time. The special carrier chain is proving very satisfactory, and the outlook is encouraging.

The rolling-mills of the Beaver Falls Iron Company, Beaver Falls, Pa., which have been shut down for several months for the purpose of putting in new machinery, have started up in full blast excepting the sheet rolls, which were to start this week.

The Oneida Steam Engine & Foundry Company, Oneida, N. Y., now manufactures chucks under the everal patents of John H. Westcott. The Westcott Chuck Company has been absorbed by the O. S. E. & F. Co.

The Bessemer & Huntsville Railroad has been organized, and will be built at once from Bessemer to Huntsville. The object of the road is to furnish ore, coal, and limestone, for any furnaces that are to be built in Bessemer, Ala.

The Central Pneumatic Tool Company has been incorporated at Ludlow, Ky., with a capital stock of $100,000, to manufacture, sell, lease, and operate pneumatic tools for mining and manufacturing purposes, by E. B. Cherry, Ebenezer A. Kinsey, and George A. Gray.

The Billings & Spencer Company, Hartford, Conn., has struck a veritable bonanza, in being the first to drop forge pure copper. The first attempt to do this that was successful was made by Mr. Billings a short time ago, and now of one article—commutator bars for electric motors—the company is making some 6000 a week. It makes them in eleven sizes, and they come from the drop ready for use save a slight truing up that is required.

The Brownsport, Cedar Creek, Tennessee, Iron and Manufacturing Company, to which we referred in our issue of January 22d, has been organized with a capital stock of $1,200,000 at Memphis, Tenn. No arrangements have been made as yet toward building furnaces. This property is located in Perry and Decatur counties, Tennessee, lying on the Tennessee River, about 30 miles above Johnsonville.

The Damascus Edged Tool Corporation was organized at Louisville, Ky., with a capital stock of $1,500,000. The President of the company, Charles Godshaw, will offer the exclusive right of using the steel for navy and war ordnance purposes to the government. A number of specimens have been prepared for such tests as the Secretary of the Navy may desire to have made. The company is organized to introduce the new process of hardening steel. A number of tests were recently made, the most ordinary iron being in a very brief space of time converted into steel.

The new works of the Forcite Powder Company at Lake Hopatcong, N. J., are about completed. It is expected that they will be put in operation about March 1st. The daily capacity will be about 15 tons. It is expected that the new works will manufacture high-grade powder entirely, so that the quantity of acids needed will not be as large as that required for the old works. The full capacity of the acid works at the lake being necessary for the older plant, the acids for the new will for the present at least be purchased and shipped to the place direct.

United States District Judge Treat, St. Louis, Mo., has rendered a decision in one of the most celebrated manufacturing cases which has of late years been in the courts—that of the Iowa Steel Barb-Wire Company, of Marshalltown, Iowa, against the Southern Barb-Wire Company, of St. Louis. The decision was against the local company, declaring that the Ross patent for barbed-wire manufacturing, under which the St. Louis Company was operating, was an infringement upon the Burnell patent, held by the Marshalltown Company. This suit has been pending for three years, and the decision of Judge Treat is regarded as the most important in barbed-wire litigation since the decision of Judge Drummond at Chicago in the Glidden case of 1884.

Cyclone Pulverizing Company of Canada, Limited, has been organized with a capital stock of $150,000 to carry on operations at 37 Mill street, Montreal, and is now prepared to undertake the pulverizing and disintegrating of any material, no matter how refractory, of either mineral, chemical or vegetable substance. The directors, Messrs. Alfred J. Brice, of Montreal ; Henry J. Drake, of Brooklyn ; Lieut.-Col. Bond, C. J. Fleet, Jas. F. D. Black, Richard Costigan, Thos. A. Hedley, Armitage, Rhodes, E. R. Costigan, of New York, and T. Strachan Cox, of Toronto. The General Manager is Mr. J. Adams Smith. The pulverizing is done by attirtion. There is no perceptible wear on the machinery, or anything liable to get out of order.

The Clare Furnace Company, of Sharpsville, Pa., has made some test fills with the new incline hoist and automatic dump purchased of and erected by the Brown Hoisting and Conveying Company, of Cleveland, O., and report very satisfactory results, the distribution being, as they express it, "perfection." Experience has enabled Mr. Brown to improve what was a very excellent dumping arrangement, so as to make the distribution adjustable at the will of the superintendent. The company has also recently contracted to erect a hoisting and conveying plant for receiving and storing sand for the Pittsburg Glass Works, Pittsburg, Pa. The plant will consist of a single cable tramway of 450 feet span, with conveyor and operating machinery and contracted with the Lake Shore Railroad for improvements at Ashtabula Harbor, including four bridge tramways (two double piers) so constructed that four additional single pier tramways can be added at any time without additional operating machinery. The Brown Conveyor at the Aurora mine, in the Gogebic Range, where it is used for removing cover in the open cut, is doing excellent work, giving great satisfaction.

CONTRACTING NOTES.

CONTRACTS OPEN will be found on page xix. New Contracts this week: No. 211, Two Piston Steam Fire-Engines ; No. 212, Electric Light and Gas Plant ; No. 213, Iron Bridge ; No. 214, Building Dam and Water Pipe ; No. 215, Construction of Dikes ; No. 216, Dredging.

The contract for steam boilers for water-works, Cleveland, O., has been awarded to J. Gawne & Son, Cleveland, for $1890.

The contract for the substructure of the Franklin Avenue bridge, Minneapolis, Minn., has been awarded to the Minnesota Stone Company for $53,185.50.

The contract for putting in water-works at Concordia, Kan., has been awarded to Cooper & Sole Bros., of Lincoln, Neb., at $45,000.

J. M. Guffey & Co., Pittsburg, Pa., want 8-inch and 10-inch iron pipe for the Grapeville Natural Gas Company.

The commissioner of Jefferson County, Ind., has awarded the contract for two iron bridges to Queen City Bridge Company, Cincinnati, O., at $17.80 per foot for the 120-foot bridge, and $23 per foot for the 160-foot bridge ; capacity of each to be 100 pounds per square foot of floor, besides their own weight, with factor of safety of four.

The contract for building the water-works at Xenia, Ohio, has been closed with Goodhue & Berine, Springfield, Mass.

A drainage project on Big Swamp Creek is to be carried out this year. Further particulars can be learned from Judge A. E. Coffee, Hayneville, Ala.

Water-works are to be erected at Ashtabula, Ohio. For further information address Mr. Henry Fassett.

The city of Wilmington, N. C., has determined to build an iron bridge over a railroad cut in the city ; span, 141 feet. The bridge is to cost $13,000.

The Iron City Brick-Works, Sheffield, Ala., have been purchased by C. T. Morris, who will double its capacity, and will make 50,000 bricks a day.

The Old Dominion Electric Light and Power Company has been organized at Richmond, with a capital of $100,000, to furnish light and power throughout the State of Virginia.

The new company that has bought out the old Brush Electric Light Company, of Chattanooga, Tenn., will put in a couple of new engines and make other improvements at once.

The Gadsden Land and Improvement Company will build gas-works at Gadsden, Ala.

Efforts are making to put up water-works at Kyle, Texas. Further information can be had from A. S. Bunting.

The Alabama & Tennessee Coal and Iron Company has awarded the contract for building three blast-furnaces at Sheffield, Ala., to Messrs. Gordon, Strobel & Laureau, of Philadelphia, Pa. The furnaces are to be 18 by 75, and with all the modern improvements, and to be finished in thirteen, fifteen, and seventeen months. The contract is for $564,000.

The Roane Iron Company has bought 50 acres of land at Johnson City, Tenn., for the purpose of building a furnace now, and a rail mill in the future, as soon as it can get ore to keep it supplied.

Rome Foundry and Machine Works, Rome, Ga., will build new works this spring, and put in a lot of new machinery.

The Cranberry Coal and Iron Company, Cranberry, N. C., has purchased land at Johnson City, Tenn., for three furnaces and a Bessemer rail-mill, which it will build as soon as cheap coal is secured for Johnson City.

The Savannah Electric Light Company has been

organized at Savannah, Ga. It will handle all electric goods, but principally operate the Westinghouse Electric Company's long-distance incandescent system. It intends to purchase a 60 horse-power engine, and one steel tubular boiler.

The Secretary of the Navy has issued a circular to about fifty steel manufacturers of the United States, giving full and explicit information as to the requirements of the department in the way of armor plates and heavy gun forgings in the prosecution of work authorized by Congress on the monitors Puritan, Amphitrite, Monadnock, and Terror, and for work on the two naval cruisers. The time fixed for receiving proposals for the forgings and plates has been extended to March 15th next, as will be seen in our advertising columns, page xix.

LABOR AND WAGES.

Nearly all of the Monongahela River mines, Pennsylvania, resumed operations on the 14th inst. Employment will be steady for several months. The fourth pool miners have decided to accept $2.25 per hundred and the prospects are most encouraging.

The strike of the Shenango Valley furnacemen, Sharon, Pa., is over. The victory is on the side of the operators, the men having agreed to return on the first advance offered by the owners—fifteen cents, with another raise of ten cents in April, providing the market keeps up.

The East Bangor Consolidated Slate Company Bangor, Pa., has shut down, and the men have gone out on strike for more wages. The strike causes the company to suffer a severe loss by reason of unfulfilled contracts. The strike, it is feared, may extend to other quarries.

The timber men struck on the 14th inst. at the Vulcan mine, owned by the Penn Mining Company, at Norway, Mich., for $2 a day, their present wages being from $1.65 to $1.80. The company refused to make any concessions, and the men were paid off. A general strike is feared.

The employees of the Norway Furnace, near Boyerstown, Pa., were granted a 10 per cent advance, taking effect on the 14th inst. The men employed at the mines will receive an increase. A movement on the part of the laborers employed at the other iron mines in this vicinity to demand an increase in wages is contemplated.

A committee of the coke workers of the Connellsville region met the Coke Syndicate in Pittsburg on the 16th inst., and demanded an advance in wages of 20 per cent. The syndicate refused this, but offered an advance of five per cent, the increase to apply to all classes of labor. This was rejected by the workmen and, after each side had submitted unsatisfactory plans for arbitrating the differences, the conference adjourned.

COST OF MINING COAL IN ILLINOIS.—The basis of the mining scale agreed upon at the Interstate Convention of Miners and Operators, in Columbus, Ohio, last week, will fix rates for mining coal at Illinois mines as follows:

At La Salle, Spring Valley, Seneca, Minonk and Winona, ninety cents a ton; Braidwood, ninety-five cents; Streator, eighty; Springfield, Lincoln, Petersburg, and all mines in the same vein, sixty-two and one half; Pana, Mount Olive, Staunton, Girard, and all mines in the same vein, fifty-six and one half; at Peoria, the rate will be seventy cents.

The operators of the Springfield mines were not represented at the Convention, and there is a report that the miners will go on a general strike there May 1st, if the scale is not granted.

GENERAL MINING NEWS.

ARIZONA.

YAVAPAI COUNTY.

SHELTON MINING COMPANY.—This company has been organized at Prescott with a capital stock of $500,000, shares $5 each, by C. Y. Shelton, P. M. Fisher, and George W. Sines. Principal office will be at Prescott. The company has bonded the Shelton, American Flag, and Real del Monte mines, situated near the head of Lynx Creek, about 12 miles from Prescott. The mines, it is stated, are large and well-defined fissure veins, and are opened by various shafts and tunnels, with about 400 tons of ore on the dumps.

ST. LOUIS AND YAVAPAI.—On the 8th inst. there were shipped five bars, 6311 ounces. The mill is said to be working to a higher percentage than ever before. The ore is running over twenty ounces to the ton, and the concentrators are saving 73 per cent. Samples of the ore of the Tip Top mine are being tested, with the idea of working it again if it is of a grade sufficiently high.

WALNUT GROVE WATER STORAGE COMPANY.—This Company has placed $350,000 of its bonds on the St. Louis market. The object of the company is to reclaim a tract of land 100 miles long and thirty mile wide, which lies in Yavapai County, a few miles from the Hassayampa River. This tract, which is valued at $1,000,000, is the security for the bonds. The object in selling the bonds is to raise money to construct an immense dam to stop the water in a canyon, catching the spring rains and thus holding in reserve enough water to irregate the land throughout the entire year.

A contract for the completion of the dam of the Walnut Grove Water Storage Company on the Hassayampa River, has been let to Messrs. Nagle & Leonard, of San Francisco, at $2.40 per cubic yard. The contractors undertake to lay over 400 cubic yards of granite rock per day. The total number of cubic yards in the dam will probably not be less than 80,000.

CALIFORNIA.

We are indebted to Mr. J. B. Randol, of San Francisco, for the following information, showing the production of quicksilver in January:

Mines	Flasks.
New Almaden	1,904
Ætna	450
Napa Cons.	181
Great Western	56
New Idria	185
Sulphur Bank	162
Redington	51
Great Eastern	76
Various	12
Total	3,077

Price, $38.50@$39 per *flask*. Market is strong, with an upward tendency.

PLUMAS COUNTY.

CRESCENT.—Since the resumption of work, the shaft has been sunk 102 feet, making the total depth 180 feet. Most of the distance, 102 feet, was through "blue curly," and that of a very hard character. Sinking will continue. The company owns water privileges, which afford ample power to run the pump, hoisting-works, and the mill.

INDIAN VALLEY.—The mill has stopped, work in the Union drift has been abandoned for the present, and the tunnels in that portion of the mine "bulkheaded." As the water in the reservoir is nearly exhausted, it was impossible to continue work in the shaft. It is understood that work on the Magna Charta tunnel will begin at once.

CENTRAL AMERICA.

HONDURAS.

A syndicate of New York and Philadelphia capitalists have obtained from the government of Honduras the exclusive privilege to establish customs works for the reduction of ores in any part of Tegucigalpa, El Paraiso and Choluteca. The syndicate owns fifteen valuable mines in the Republic, having acquired them under condition that they should be thoroughly developed, and that roads should be constructed from them to the coast. The St. Louis parties who have joined this syndicate will erect the necessary reducing and smelting apparatus, and will receive one half interest in each mine. It is proposed to make St. Louis the headquarters of the company. Mr. Whittaker Wright, of Philadelphia, who represents the Eastern capitalists, is now in St. Louis negotiating with parties there.

COLORADO.

QUINCY.—The subscriptions of 10 cents per share asked of the stockholders, in order to settle the financial difficulties of this company, have so far not come in in a sufficient number to raise the necessary money. A meeting was to be held this week to devise some plan of preventing the sale of the property. This is the second attempt that has been made to save the Quincy, and the second that has failed. The probability is that it will be sold out and bought by the large stockholders, who will furnish the money to do the development necessary to open up the property. We referred to the company in our issue of the 5th inst.

CLEAR CREEK COUNTY.

CENTENNIAL.—The ore-body in the bottom of the shaft measures about 2½ feet in thickness. The shaft is now down 250 feet, and drifts have been started east and west, which show from 2 to 3 feet of iron and copper pyrites, galena, blend and gray copper. The ore mills 2½ ozs. gold, 20 odd ozs. silver, and markets $5 in copper to the ton. Over 46,000 pounds of ore was sold in January, which netted, it is stated, $60 a ton.

DIAMOND TUNNEL GOLD AND SILVER MINING COMPANY.—The Corry mine, which is owned by this company, is bisected by the tunnel at a distance of 2200 feet, at a vertical depth of 708 feet, and a depth on the dip of 845. The work, however, has been mainly from the surface, although it is the intention of the company to eventually work the mine through the tunnel, and to this end they have been raising from the tunnel to connect with the shaft. They will also sink the shaft 80 or 90 feet, which will probably complete the connection. Preparations are making to resume work on levels 1, 2 and 3. Levels 4, 5 and 6 are being driven ahead both east and west, and stoping going on over each. The output of the mine for last month were over $12,000. By the completion of the work now laid out, several more levels will be started; the mine can be worked more advantageously and economically.

NEATH MINING COMPANY.—The work of clearing this mine from water and getting ready for active work has begun. John W. Dumont retains the sole management. The St. Louis parties who recently bought an interest in this property are expecting to have another dividend paying property in the Neath. The mine is well located in the valley of Clear Creek, and will connect with a short tramway with the Georgetown branch of the Colorado Central railroad.

DOLORES COUNTY.

PASADENA.—This company has made arrangements to do 1000 feet of development work on the Leila Davis the coming season, but will sell none of its ore until a better market than the present is afforded.

LAKE COUNTY.

We condense the following from the Leadville *Herald-Democrat*:

ADAMS.—The official report of the Director's meeting states that the character of the ore is low-grade, ranging in value from $10 to $30 per ton. The greater portion of the ore now in sight is of the lowest grade. The development work for the last six months has been confined to the workings of the second contact, with the indications of a very large body of ore, but being of a lower grade than the upper contact, can not be worked to advantage until a concentrator is erected. This work will now be discontinued and the development confined to the upper contact and to the old Brookland discovery shaft, where the company expects to strike a higher grade of ore, owing to its continuity to other high-grade producing mines. The directors, in view of this, do not feel warranted in continuing operations until such time as value and cost of production adjust themselves. They express the hope that this step may meet the approval of all who are interested in the property, as, in their judgment, it is the only feasible and proper course to follow, and the only one whereby the interests of the stockholders can be best conserved. The board also states that it has no doubt as to the future value of the property, and hopes in a reasonably short time to again resume dividends. The estimated quantity of ore in sight ranges from 30,000 to 40,000 tons, the gross value of which is not less than $500,000. The increased smelting charges, double that of last year, and the low price of silver and lead, would, however, entail a loss to the company this year, as compared with the output of last year, of about $100,000.

CHRYSOLITE.—The total receipts for ore in 1886 were $96,292.38, as per official advices.

GREAT HOPES.—The company has increased its working force, and intends to open up its various properties on a large scale. From a portion of the original Hibernia property, covering the southern portion of the Surprise lode, the lessees are making regular shipments of 20 to 25 ounce ore. The lease on the northern portion of the Hibernia lode is reported to be showing occasional bunches of ore, but has not yet begun producing regularly. In the Amie mine, the lease covering the southern portion of the lode, embracing shafts Nos. 6 and 7, has recently become productive. The northern portion of the property, including No. 5 shaft, also under lease, is producing 40 to 80 tons of low-grade iron ore daily. A good streak of rich ore has also been disclosed in a winze, but is temporarily under water, and inaccessible just now. The Climax Lode, adjoining the Amie, and under the same management, is not doing so well. The parties who have a lease near the center of the prop-

erty, have sunk a new shaft, but so far have disclosed no pay ore.

IRON-SILVER.—During 1886, there were produced 25,877 tons, which yielded $778,311.09.

MANSFIELD.—The new machinery recently started up at the Capen shaft on this group is working admirably. The shaft is being rapidly sunk, and at ninety feet in depth has penetrated through the overlying gray porphyry cement, and is now wholly in white porphyry. Large pumps, both for station and sinking, have been ordered.

NEW PITTSBURG.—The lessees of the old Bullion Shaft of the New Pittsburg mining group are extracting large quantities of fine looking black iron ore.

TIP TOP.—The verdict of $49,164.34 secured by the owners of this mine, as mentioned in our last issue, against the Enterprise Mining Company, owning the Forepaugh mine, is only the beginning of further litigation, already indicated in our issue of the 5th inst. The judgment secured covered only a short period, up to June 9th, 1886. Since June 9th, when the trespass was first discovered, the manager of the Tip Top alleges $26,000 worth of ore was unlawfully extracted. Also that previous to the time of the late verdict of $49,164, or during 1884 and 1885, the Forepaugh miners extracted ore to the value of $100,000 from the territory of the Tip Top lode. Papers are now about completed preparatory to filing suits to recover these amounts. The Tip Top mine is looking very promising, disclosing a large body of fine ore in the newly driven lower level to the southeastward.

PITKIN COUNTY.

A suit that has caused considerable interest among mining men has been decided in the United States court at Denver. The question involved is one of ejectment brought by Orville H. Tobey, of Chicago, against Jerome B. Wheeler and the Aspen Mining and Smelting Company. A verdict was returned in favor of the plaintiff, in which he acquires a three-eighth interest in the Aspen Mammoth lode, commonly called the Vallejo lode. The interest in this lode was claimed by the smelting company on the ground that there had been a forfeiture from the failure to do the assessment work of 1882.

VALLEJO VS. ASPEN MAMMOTH.—In the case of the Vallejo against the Aspen Mammoth, which was to be tried in the U. S. District Court this week, the plaintiffs have abandoned the suit.

SUMMIT COUNTY.

ROBINSON CONSOLIDATED.—It is stated that the present manager, Mr. McDonald, is putting the mine in the best shape it has been for years. The property is worked altogether by leases. Since his administration, he has put out thirty-five car-loads of ore, all of which will go to Denver, as the product secures a higher price in that market.

DAKOTA.

LAWRENCE COUNTY.

DEADWOOD-TERRA.—Official advices show that the production for the past year was $600,585; in January of this year, $55,231.15 was produced.

HOMESTAKE.—The production during the past year, as per official advices, was $1,046,221; during January of this year, it was $86,018.64.

IRON HILL.—At the last monthly meeting of the directors, it was decided to erect a new 50-ton smelter on the site of the present smelter, or adjoining it, so that the present engine, boiler, crusher, and much other machinery may be utilized. It is expected to have the works in operation within sixty days. The smelting capacity will be about sixty tons daily. The company will enter the market as a purchaser for all ores now being shipped to Omaha. In addition, parties who have amounts too small to ship will find a buyer in the company, as the works will be of ample capacity to not only reduce their own ores, but all such other ores as may be offered. In case the supply should be greater than the new plant will be able to handle, an additional stack will be built.

LIBERTY.—The report presented at the annual meeting shows that the total receipts for the year were $10,230.38; disbursements, $9413.77, leaving to all appearances $816.61 in the treasury. The first cost of the hoisting-works is not included in the secretary's exhibit. The treasury is without funds.

GEORGIA.

LUMPKIN COUNTY.

COLUMBIA.—The twenty-stamp mill is ready for operations, and will work custom ore.

HAND.—The largest clean-up since the new mill has been started was made last week, and it is thought the yields will continue fully as well. The cut is in good shape and shows good ore. Some rich ore has been found on Wimpy lot.

IVEY.—The mill has started up.

ILLINOIS.

SHELBY COUNTY.

SHELBYVILLE COAL OIL AND NATURAL GAS CO.—This company has been organized, with a capital stock of $5000, to drill for natural gas. Operations are to begin at once.

INDIANA.

WHITE COUNTY.

Reports announce that oil was struck near Monon, at a depth of between 600 and 700 feet.

KENTUCKY.

MERCER ECONOMIC LIGHT AND HEATING COMPANY.—This company has been organized, with a capital of $100,000, at Harrodsburg, to drill for natural gas.

MEXICO.

The following statement shows the imports from the United States into Mexico at the different periods mentioned:

	1876.	1881.	1886.
Chemicals, etc.	*$111,348	$212,477	$176,091
Iron and steel manufactures.	1,062,687	2,582,346	904,554
Petroleum	171,348	173,155	185,8:1
Explosives	156,136	95,320	128,118
Quicksilver	365,097	462 1:9	192,111

* Gold values.

LA NOIRA.—A report issued shows that the company, whose properties are situated in the State of Zacatecas, has contracted with Messrs. Fraser & Chalmers, of Chicago, for a twenty-stamp mill, of the best modern type, and a Cornish pumping plant, with power to raise 150 gallons of water per minute from a depth of 700 feet vertically. On January 27th the shipment of both sets of machinery began at Chicago. J. K. Owens, of California, has been engaged to take charge of the erection of all the works. A full equipment for machine shop, carpenter shops, blacksmith shop and saw-mill has been bought and is being shipped. All the works and the mine will be connected by telephone and lighted by electricity. At all points, the affairs of the company are being pushed ahead, and the works will be finished and shipments of bullion begun as early as practicable, which will be by August next. It is now estimated that the works, when completed and running, will cost about $100,000. The company has no debts. All its operations are for cash.

MICHIGAN.

COPPER MINES.

CALUMET & HECLA.—The management expects to be able to begin hoisting from No. 10 double compartment shaft about March 15. When this shaft is in readiness for hoisting, it is calculated that the daily output from the South Hecla can be made easily to reach 900 tons. As the rock from this portion of the mine averages fully 3 per cent. of mineral, the effect of the increased product will be to increase to a considerable degree the monthly product of the mine, that is, if the old portions of the mine are able to keep up a proportionate production.

OSCEOLA CONSOLIDATED.—The reported to be presented at the annual meeting in March shows that the year's operations and financial condition of the company are as follows: Product of mineral, 4,133,545 pounds, at 86·14 per cent, gave 3,560,786 pounds refined copper, for which has been realized the gross sum of $374,144.13; from interest receipts, $206.01; sale of building lots at Hancock, $240; sales of silver, $1308.93—$1754.94; total receipts, $375,899.07. Expenses: At mine, $262,068.44; smelting, transportation, and all other, $46,598.19; total, $308,666.63; mining profit, $67,232.44. There has been also realized from 360 shares of Hancock & Calumet Railroad stock, $36,000; the balance of assets January 1st, 1886, was $102,281.60; add 250 shares Hancock & Calumet Railroad stock, $25,000; total, $127,281.60; less expended in mine plant during the year, $4772.05, gives $122,509.55; and makes the balance of assets January 1st, 1887, $225,741.99. From the earnings of the year, a dividend of $1 per share, or $50,000, has been declared. The smelting arrangements are not satisfactory, and the directors have under consideration a plan by which they will place the handling and marketing of the company's products in better shape.

GOLD AND SILVER MINES.

ROPES.—The official report for January shows the production to have been $4259. Fifteen stamps will shortly be added to the mill.

IRON MINES.

DEXTER.—Recent developments at this mine have shown up a body of fine, hard hematite ore at a depth of about 220 feet.

FLORENCE.—The old workings of this mine will be unwatered; and as soon as the workings are in condition for occupancy, a large force will be put on and active mining will be inaugurated.

LAKE SUPERIOR IRON COMPANY.—This company has just started a shaft on its property adjoining the Detroit mine. The Detroit vein makes west very regularly, has a strong stope in the west breast, and no doubt the deposit continues on to the property of the Lake Superior company. The shaft will be a vertical one until the foot-wall is reached, when it will follow the incline, which is quite sharp.

At the exploration to the west of the Lake Angeline mine, the shaft is being pushed downward with all possible speed to reach the ore struck with the drill.

MINNESOTA.

SANGAMON COAL COMPANY.—This company has been organized at St Paul, with a capital stock of $150,000, shares $100 each, which may be increased to $1,000,000, for the purpose of mining, handling, buying, and selling coal and other fuel. Also, the purchasing and leasing of lands, the erection of buildings thereon, the procuring of franchises and property and rights of every other description for the purpose of extending and successfully operating the business of coal mining and the general fuel trade. The principal place of business will be at St. Paul.

MISSOURI.

The St. Louis & Southwestern Railroad, which will be built this summer, will give of the city Cape Girardeau direct entrance to the Big Muddy coal-fields, which will be of benefit to that city as well as the country south.

RALLS COUNTY.

VANDALIA COAL COMPANY.—This company, to which we referred last week, has stopped prospecting for coal near New London.

MONTANA.

DEER LODGE COUNTY.

BI-METALLIC.—Work at the shaft is pushed vigorously. The only ore lifted from the lower workings is that necessary to remove in driving the levels ahead. Of this there is but little that will not do for shipment, all being of good quality. It will soon be necessary to substitute heavier hoisting machinery for that in present use.

GRANITE MOUNTAIN.—Official advices show that during 1886 there were shipped 1,483,599·66 ounces of pure silver; 670,444 ounces of gold; the gross proceeds of bullion produced were $1,476,781.92, and the proceeds of smelting ore sold during the year were $160,148.77, making a total of $1,636,930.69. The production in January of this year was about $166,700.

HOPE.—Official advices state that the production for 1886 was 148,550 ounces of silver, which yielded $145,515.82.

LEWIS & CLARKE COUNTY.

BOSTON & MONTANA GOLD MINING COMPANY.—Official advices report the production for 1886 at $514,537.54. During the last nine months, the company has been running only forty stamps, and development work has been in progress on new ground.

EMPIRE.—The output of the mine for January was $19,750.

GOLD BLUFF.—A recent letter from Montana says the owners of this group of mines, while doing development work on the Chase gold lead, opened on the vein some forty feet, a fine body of free-milling gold quartz running from forty to two hundred and fifty dollars per ton. The vein matter is two feet wide, and is a strong, well-defined, and continuous body in granite. The recent rich strike in the Little Dandy, which lies on the same belt but a short distance from the above group, goes to prove that this district is, and will be, of much importance in the future. The properties lie about one mile from New York Gulch, made famous by its placer ground, many millions having been taken therefrom, and now being extensively worked. A new flume costing $165,000 will be finished by spring. The district lies twenty-five miles northeast of Helena.

MONTANA COMPANY, LIMITED.—The production in January was $180,000,

NEBRASKA.

DAWES COUNTY.

While drilling a well at Chadron, at a depth of 530 feet, last week, a stratum of coal shale was struck, and upon going down good coal indications were found.

NEVADA.

EUREKA COUNTY.

EUREKA CONSOLIDATED.—Official reports show that the production in 1886 amounted to $244,447.

STOREY COUNTY—COMSTOCK LODE.

We condense the following from the Virginia City *Chronicle*:

The following are the financial balances of the various Comstock mining companies on February 1st:

CASH ON HAND.

Andes	$1,333.82	Dudley	$301.15
Alta	20,341.51	Exchequer	17,629.41
Alpha	6,460.02	Gould & Curry	4,872.42
Best & Belcher	15,493.92	Julia Con.	1,171.39
Benton Con.	5,231.66	Lady Washington	189.56
Belcher	3,688.52	Mexican	2,082.89
Bullion	670.46	Orleans	1,703.40
Challenge Con.	3,211.31	Ophir	37,136.94
Chollar	43,871.07	Occidental	1,392.24
Crown Point	24,210.74	Potosi	13,456 67
*Con. Cal. & Va.	346,336 42	Sierra Nevada	323.41
Con Imperial	8,890.42	Utah	1,137.60

* Cash in bank and unsold bullion on hand of the assay value of $187,320.05, with the final shipment representing the clean-up for the month of January to be added. From this sum is to be deducted the unpaid expenses for January. The total monthly expenses heretofore have not exceeded $160,000, including the monthly pay-roll, which sum has already been disbursed, and footed up $33,623.

INDEBTEDNESS.

The following companies report having an indebtedness February 1st, 1887:

Hale & Norcross	$17,570.37
Savage	55,146.17

CHOLLAR.—Arrangements for exploring the 1300 level have been consummated with the Hale & Norcross Company.

CONSOLIDATED CALIFORNIA & VIRGINIA.—The report for the week ended the 5th inst. shows that during the week 909 tons of ore were shipped to the Morgan mill, and 2060 tons to the Eureka mill. The average assay value of all the ore worked at both the above mills during the week, according to battery samples, was $28.49 per ton. This shows a falling off of $8 per ton in the value of ore extracted as compared with the previous week. It is due to the fact that a periodical clean-up of all ore left behind in stopes was made during the present week regardless of grade. The official statement of the ore worked and the bullion produced for January, filed in the San Francisco office February 7th, together with the closing bullion shipment for the month, the assay value of which is $88,207.06. The gross bullion product for January was $372,802.82, of which $134,998.53 was gold and $237,804.29 was silver. The ore worked at the Morgan mill amounted to 4280 tons, giving an average assay value per battery sample of $33.45 per ton, and yielding an average of $29.74 per ton in bullion. The ore worked at the Eureka mill amounted to 7580 tons, giving an average battery assay of $39.43, and yielding an average of $32.38 per ton in bullion. President Fish states that after paying all expenses to date and the dividend due on the 10th inst., the company will have a surplus of at least $300,000 in the treasury.

POTOSI.—The south lateral drift No. 2, on the 250 level, is penetrating a belt of soft, decomposed vein matter, mingled with quartz. Operations at other points are suspended. In exploring the ore-development on the 250 level, about 500 tons of ore were extracted and stored in the bins at the ore-dumps.

OVERMAN.—Ore shipments from this mine to the Vivian mill, on the Carson River, began on the 8th inst., and will continue steadily for some time to come. The daily shipment will average 64 tons. The ore is extracted from the upper levels through the old shaft. Desultory ore shipments have been made at intervals from the mine during the past two years, whenever crushing facilities were obtainable, but the ore heretofore shipped was extracted from above the 250, or tunnel level. The present output is extracted from below the 400 level, and is higher in grade than that obtained from above the tunnel level. The low grade of ore recently produced from the Crown Point is the cause of the management of that mine relinquishing the Vivian mill to the Overman.

SAVAGE.—Operations are now conducted through the Curtis shaft. Ore extracted from the 600 level is shipped to the Mexican mill. The first shipment was made on the 8th inst. The vein on the 1640 level is showing well. The south drift on the 800 level lacks about eighty feet of connecting with the shaft.

WASHOE COUNTY.

RENO SMELTING MILL AND REDUCTION WORKS.—The works have now been in full working order for some weeks, and shipments of bullion have been made. A smelter has since been erected and was to have been in operation by this time. In our issue of November 20th, we gave full information relating to these works.

NEW MEXICO.

GRANT COUNTY.

SHERIDAN.—The committee appointed at a recent meeting of the stockholders, mentioned in our issue of last week, have investigated the books and found that the directors and superintendent had advanced the company $59,593 74 more than was required by the contract, and that the company is indebted to them to that amount. They agree to relinquish all claim to the debt of $59,593.74 if the stockholders will raise not less than $15,000, to be used in prospecting the Sheridan or working the Four Hawks, and they also agree to pay their proportion of the $15,000. A meeting of the stockholders was held on the 14th inst., and it was decided to assess the stockholders for the purpose of securing the $15,000 above referred to. The stockholders voted unanimously to contribute the assessment if the report of expert Harland upon the Four Hawks mines was favorable.

SIERRA COUNTY.

It is stated that parties interested in the mines at Kingston have opened negotiations with the Atchison, Topeka & Santa Fe Railroad Company with a view to extending their line from Lake Valley to Kingston.

SOCORRO COUNTY.

PEACOCK.—The report of the treasurers shows a balance in hand of $1380.25, with claims against the company of $1079.46. Mr. James Richardson, the President, has just returned from the mine and says that under good management the same can be profitably worked for years. As the money necessary to work the mine can be furnished, work has been resumed with an extra force of men. Orders have been given to purchase 400 feet of twenty-inch iron pipe to furnish additional water power to work both hydraulic drills.

NORTH CAROLINA.

CHATHAM COUNTY.

A. H. Leftwich, of Greensboro, who has leased the Deep River coal-fields, near Gulf, will put in new machinery and develop them. We referred to this field in our issue of the 5th inst.

PENNSYLVANIA.

COAL.

It is reported that a syndicate of New York and Philadelphia capitalists has secured an option for six months on a large tract of coal land in the Monongahela Valley. A quarter of a million dollars is said to be the aggregate of the transaction. The effort was made to get the entire block from the Monongahela to the Youghiogheny River at the uniform rate of $50 an acre. But this was not wholly successful. In most instances $50 was the price agreed on, but, near the rivers, as high as $60 and $65 was paid. The entire block is supposed to contain about 5000 acres. Twenty years ago, coal was bought in the same field at $100 an acre right alongside of tracts which in this deal go for $50. Besides this tract, the same syndicate is understood to have acquired what is known as the Howell purchases, comprising 1300 acres of coal in Elizabeth township, bought by the Howells, of Philadelphia, twenty years ago. This includes the coal under Samuel Scott's farm, a part of the William Finney place, a part of James Wood's, and the Samuel Herr, Bailey, and Crombie farms.

J. M. SCHOMAKER COKE COMPANY.—This company of Alleghany County has filed notice of an increase of capital stock from $5000 to $1,300,000, additional stock being issued for real and personal estate.

LEHIGH COAL AND NAVIGATION COMPANY.—The annual report shows a total revenue for the last year of $1,728,507.85, and disbursements of $1,108,486.89; leaving net earnings of $620,020.96, out of which $570,408.25 was paid in dividends. The coal tonnage of the company for the year was 5,148,224 tons. The company will soon enter Scranton over a line of its own. The contract with the Union Coal Company, by which the former company obtained an entrance into Scranton over the railroad line of the latter corporation, expired on November 7th, 1886. The report shows that the profit per ton on coal mined during the year was only 13 cents—the lowest price ever known in the history of the company.

MERCER MINING AND MANUFACTURING COMPANY.—Richard Irwin, Jr., and Frank Dunning, of New York, petitioned the United States Circuit Court, at Pittsburg, last week, to be allowed to devote $200,000 of the $228,500 which they agreed to pay for the Mercer Mining and Manufacturing Company to their bonded interest in the concern, which aggregates that amount. The $228,500 they have already paid, it is alleged, fully covers all expenses of the sale and other outstanding indebtedness.

NATURAL GAS.

HOME COMPANY.—A flow of gas was struck on the 12th inst., at a depth of 2,060 feet, at the company's well at Brownsville. The drill had just entered the crust of the Gordon sand. The flow has since largely increased as the drill goes down.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to February 12th:

	1887. Gallons.	1886. Gallons.
From Boston	610,870	358,452
Philadelphia	11,921,184	12,943,752
Baltimore	1,102,698	1,484,679
Perth Amboy	1,605,465	.....
New York	37,766,119	45,720,397
Total exports	53,066,336	60,507,280

The Chief of the Bureau of Statistics reports the total values of the exports of mineral oils from the United States for the month of January, 1887, and during the seven months ended January 31st, 1887, as compared with similar exports during the corresponding periods of the preceding year, as follows: January, 1887, $3,759,237; January, 1886, $3,687,089; seven months ended January, 1887, $28,075,880; seven months ended January, 1886, $30,465,676. These exports comprise about 99 per cent of the total exports in mineral oils.

TENNESSEE.

RHEA COUNTY.

Messrs. Nelson, Buchanan & Co., Dayton, Tenn., will soon begin work on iron ore lands, secured by leases, in the vicinity of Dayton.

UTAH.

SUMMIT COUNTY.

SAMPSON.—It is stated that about ninety thousand

BULLION PRODUCTION FOR 1886—SPECIAL OFFICIAL REPORTS.

MINES.	States.	Month of December.	Year from Jan. 1st, 1886.
		$	$
Alice, G. S	Mont.	**	1,054,796
Belmont	Nev.	——	3,255
Bodie Cons., G	Cal.	——	19,463
Boston & Montana, G.	Mont.	28,827	514,538
Bulwer Cons., G.	Cal.	.....	70 144
Caledonia, G.	Dak.	——	172,960
Christy, S.	Utah.	.....	249,532
Chrysolite, S.	Colo.	**8,576	196,292
Colorado Central, S.	Colo.	18,506	264,944
Daly, S.	Utah.	.....	677,884
Deadwood-Terra, G.	Dak.	52,421	600,585
Derbec Blue Grav., G. S.	Cal.	.....	173,118
Elkhorn, G. S.	Mont.	.....	175,620
Empire, G. S.	Mont.	21,000	75,000
Eureka, S. L.	Nev.	32,928	244,447
Father de Smet, G.	Dak.	——	61,376
Freeland, G. S. C.	Colo.	23,870	297,758
German Consolidated, G.	Colo.	.....	53,673
Granite Mountain, S.	Mont.	208,631	1,636,931
Head Center Cons., S.	Ariz.	——	4,633
Head Center & Tranq., S.	Ariz.	——	25,818
Hecla, G. S. L. C.	Mont.	29,861	585,151
Helena, G. S. L. C.	Mont.	.....	240,234
Holmes, S.	Nev.	.....	403,521
Homestake, G.	Dak.	76,338	1,046,221
Hope, S.	Mont.	18,755	145,516
Independence, S.	Nev.	——	15,000
Iron Hill, S.	Dak.	**	383,346
Iron Silver, S. G.	Colo.	.....	778,311
J. D. Reymert, S.	Ariz.	——	5,771
Kentuck, S.	Nev.	——	*3,346
Lexington, G. S.	Mont.	63,875	860,886
Montana Limited, G. S.	Mont.	202,000	1,724,800
Moulton, G. S.	Mont.	52,991	731,227
Navajo, G. S.	Nev.	——	138 944
New Pittsburg, S.	Colo.	——	6,330
North Belle Isle, G. S.	Nev.	——	20,285
Ontario, S.	Utah.	.....	1,540,171
Plymouth Consolidated, G.	Cal.	.....	565,511
Plutus, G. L. C.	Colo.	4,788	145,783
Ropes, G. S.	Mich.	4,389	41,384
Silver King, S.	Ariz.	88,602	853,187
Small Hopes Cons., S.	Colo.	71,541	1,038,792
South Yuba, G.	Cal.	——	2,677
Standard Consolidated, G.	Cal.	12,026	216,411
Stormont, S.	Utah.	12,356	144,068
Tombstone, G. S. L.	Ariz.	——	†**491,070
Total		.....	$18,585,424

G., gold; S., silver; L., lead; C., copper; M., mica. Silver valued by the different companies from $1@$1.29 per ounce; gold, $20.67. † Not including value of lead and copper. ** Silver valued at $1.29. * Royalty. ‡ Net. § Ore sales. ‖ Not official. —— No shipments during month mentioned.

shares are held in reserve in the company's treasury, and this block is to be sold, as soon as a good figure is reached, in order that full justice be done the old stockholders who paid a high price for the stock, which is now quoted at from $3.75 to $4.25. The mine is being worked this winter on a lease. Some ore is being extracted and shipments have been made. It is stated that some rich developments have been recently made in the mine.

WAHSATCH MINING COMPANY.—In the Third District Court, Salt Lake City, on the 5th inst., in the case of Wahsatch Mining Company *vs.* J. H. Jennings, in which a decision was rendered by Judge Boreman, as mentioned in our issue of January 29th before whom the case was argued, thirty days additional time was allowed the plaintiff to prepare a statement, and a stay of proceedings was granted.

WASHINGTON COUNTY.

STORMONT.—At the company's mines, prospecting is going ahead rapidly, and the drift on six north is opening well and bids fair to open a good ore-body.

MARKETS.

NEW YORK, Friday Evening, Feb. 18.

Prices of Silver per ounce troy.

Feb.	Sterling exchange	Lond'n Pence.	N. Y. Cents	Feb.	Sterling exchange	Lond'n Pence.	N. Y. Cents
12	4.88½	*	101⅞	16	4.88½	*	101⅞
14	4.88½	*	101⅞	17	4.88½	*	101⅞
15	4.88½	*	101⅞	18	4.88½	*	101⅞

*46 11-16.

The market has been very steady, without any special indications.

Foreign Bank Statements.—The governors of the Bank of England, at their weekly meeting, made no change in the minimum rate of discount, and it remains at 4 per cent. During the week, the bank gained £749,000 bullion; and the proportion of its reserve to its liabilities was raised from 50·07 to 51·28 per cent, against 48½ per cent at the same time last year. On the 17th inst., the bank gained on balance £12,000 bullion. The weekly statement of the Bank of France shows a gain of 2,475,000 francs gold and a gain of 3,325,000 francs silver.

Copper.—This market is in an anomalous condition. With a very active consumption, which is certainly in excess of our present production, we find the market pretty generally looking for another drop in prices by the Calumet & Hecla Company, which the company, however, disclaims any intention of making; and we find, also, very low quotations by the Baltimore works; it is said down to 9¾ cents, though other casting brands are held at 10@10½c.

Why there should be any talk of lower prices is a question no one seems able to answer, though many more or less plausible opinions are advanced. One says the Calumet & Hecla is again endeavoring to make a large sale by offering exceptionally low prices, and thus leave the other companies to go without a market or export.

This explanation overlooks the fact that at present rate of production we will have no copper to export, and if the price advances to a point where the Anaconda, the Copper Queen, and other large mines will start up work, the drop in price will again have been demonstrated to have been uncalled for.

Moreover, it is generalty understood that the other Lake companies will meet any price the Calumet & Hecla may make, and the knowledge of this will make manufacturers indifferent about contracting or buying largely from the Calumet & Hecla. Manufacturers still exhibit some feeling when referring to the last drop from 12 to 11 cents.

Whatever explanation of the Calumet & Hecla's sales department management policy may be given, there appears to be generally in the trade a pretty unanimous condemnation of it, and it is suggested that an analysis of the company's mysterious accounts would show room for the exercise of greater wisdom in more than this one department.

We quote here: Lake 10⅞@11c.; Orford, 10½; Baltimore, 9¾@10c. Chili bars are quoted by cable to-day £39 2s. 6d., and best select, £44.

Messrs. James Lewis & Son report, under date of February 1st, as follows:

The statistics at the end of the month showing an improvement, and the fear of immediate war proving groundless, the market yesterday improved, and closes firm to-day, with buyers at £38 18s. 9d. for cash, and £39 10s. for three months.

Smelters have taken delivery of a considerable quantity of Chili Bars, and have secured all the furnace material obtainable at current rates. They are still buyers, but the small quantity available is held for higher prices.

Three hundred tons of Montana matte have been returned to New York during the past month, higher prices being obtainable for it there than here.

The Lake Superior companies have contracted to supply the requirements of American consumers for the next three months, at 11 cents per lb., or £52 5s. per ton, with 2½ per cent discount. This is £10 above the value of English best selected in Liverpool.

Early in January about one half of the Anaconda furnaces were shut down, and a week ago cablegrams were received stating that the remainder had stopped running. It appears pretty certain that little, if any, Anaconda matte will arrive here before May, assuming that some of the furnaces start again at an early date. It is expected that with the return of Spring the men employed at the smelting-works at Anaconda will again strike for the rate of wages they previously received, and which is still paid to the miners at Butte, as work will then be more plentiful elsewhere.

The visible supply of copper shows a decrease during the past month of 1678 tons, and we look for a steady decrease of stocks during the next two or three months.

The arrivals from Chili during the month have been 2793 and the deliveries 2476 tons, and from other countries 3175 and 3403 tons fine, respectively.

The arrivals here from the United States have been 131 tons matte, equal to about 66 tons fine copper, and in France 645 tons fine.

The Chili charters for the month are 2100 tons, and the closing rate of exchange is 22¾d.

Quotations to-day are Chili Bars of G. O. B.'s, £38 18s. 9d. for sharp cash, and £39 11s. 3d. for three months prompt. English Best Selected, £43 5s., and Urmeneta Ingots, £43 10s. per ton in Birmingham. India Sheets, £47 per ton. Ore of 25 per cent, 7s. 7½d. American Matte and Chili Regulus, 7s. 10½d. per unit.

Tin.— This market has been remarkably steady, with sales at the Exchange aggregating 80 tons during the week, at $22.50@$22.60 for February, March, and April tin.

Cable advices to the Exchange to-day quoted spot Straits £101, and for futures £101·15s.

Lead.—Cable advices to the Metal Exchange to-day quote Soft Spanish Lead £12 12s. 6d.

Lead was sold during the week to the amount of 150 tons at 4·40c., and 4·45c. is asked, but the market is very quiet. The corroders, having given up their combination and got on a kind of toboggan slide in prices, have been doing a rushing business at, it is said, 5¼ cents for White Lead. This is a price quite unprofitable to the corroders, but attractive to the dealer and consumer, who are stocking up, and are thus creating quite a demand for lead.

The Eastern shot manufacturers, at a meeting this week, made a reduction in prices, in order to meet the competition of Western manufacturers.

Drop shot, per 25-lb. bag	$1.50
" " " 5-lb. "	.35
Buck and chilled, per 25-lb. bag	1.75
" " " 5-lb. "	.40
Lead pipe	7c. per lb.
Sheet lead	7¾c. "
Tin-lined lead pipe	15c. "
Block tin pipe	40c. "

Subject to the usual 20 per cent discount on sheet and pipe.

Messrs. Everett & Post, of Chicago, telegraph as follows to-day:

Our market remains about the same, if anything a shade firmer. There is a better feeling due to growing inquiry, and offerings are very light. Holders, anticipating better prices, have withdrawn from the market and refuse to make sales for future delivery at present prices. Sales for the week are about 600 tons, principally at 4·25c., though one lot sold at 4·22½c. The market closes extremely sensitive at 4·25c. bid.

Spelter.—The London market by cable advices to-day quotes £14 5s. for Silesian. We quote 4·40@4·60c., according to brand, and 6½@7c. for New Jersey.

New Jersey Zinc Oxide, 4@4½c., according to grade.

Antimony.—Cables to the Metal Exchange to-day quote Hallett's at £30. The market here remains at 7½@7¾c. for Hallett's and 9c. for Cookson's.

Quicksilver.—The market remains unchanged. We quote $41 per flask, and in London £7 7s. 6d.

Nickel.—We quote 60c.

Aluminium—Is quoted at 90c.@$1 an ounce. We hear of sales on foreign order of 20 tons of 10 per cent Cowle's aluminum bronze at about 45c. The Cowles Company is, we understand, making about one ton of aluminum bronze a day.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Feb. 18.

American Pig.—The iron market is steady, with less of "boom" about it than for some time past; indeed, the question of "higher prices in the near future" is not now often heard. The market is in a very healthy condition, a large consumption, and the prospect of a good business throughout the year; but unless foreign prices advance, there is not much room for an advance here, nor is it desirable. We note sales of several thousand tons at our quotations, which remain: Standard Lehigh and North River brands $22@$22.50 for No. 1 X, and $21 for No. 2 X. Forge is quoted $18.

Scotch Pig.—The Scotch irons remain practically unchanged, though the decline in Glasgow has made it possible to import at our quotations, which a few weeks ago was not the case. We continue to quote: Coltness, $22.75@$23.25; Summerlee, $22.50@$23; Clyde and Dalmellington, $21@$21.50; Gartsherrie, $22.50@$23; Glengarnock, $22@$22.50; Eglinton, $21.

Cables to the Metal Exchange to-day quote: Coltness, 57s. 3d.; Langloan, 53s.; Summerlee, 55s. 6d.; Gartsherrie, 51s.; Glengarnock, 50s. 3d.; Dalmellington, 47s. 9d.; Eglinton, 45s.; Warrants, 43s. 5d.; Middlesboro', No. 3, 35s. 6d. Freights are 8@9s.

Bessemer Pig.—There is quite a large demand for Foreign Bessemer, and several lots have been contracted for at $21.25 to $21.50. We continue to quote $19.50@$20.50 at furnace for Domestic. Foreign is $21.25@$21.50.

Spiegeleisen.—This market is quiet, and prices remain at from $28@$28.50 asked for both English and German 20 per cent Spiegel.

Steel Blooms and Billets.—Some business is reported at $32.50 for Billets, but in Blooms we do not hear of any transactions. Prices continue at from $30@$30.50 for Rail Blooms. Billets, $32@$33, according to size and quality. Nail Slabs, $32.50@$33.50. American Charcoal Blooms, from $54@$56. Scrap Blooms, $36@$37.

Steel Rails.—There is quite a strong feelling in the market on account of the mills generally being well supplied and not over anxious to take orders, though the demand is still urgent and we hear of sales of 3500 tons at, it is said, $39, and of about 10,500 tons at $40. Cleveland and Chicago quote $23@$23.50. We quote $39@$40 Eastern mills.

There is so urgent a demand that mills well supplied with orders are tempted to ask higher prices than they expect to get, but it is evident that our prices can not advance without a previous advance in Europe. English rails are quoted $43, delivered in New Orleans.

Structural Iron and Steel.—This market is still active, and our mills are quite well supplied with orders for months ahead. Bridge orders are plenty, and some elevated railroad orders are now on the market. Some attention is also given to the possibility of the Arcade road being built up Broadway, etc. It would require a large amount of structural iron or steel. We quote: Bridge Plate, 2·4@2·5c.; Angles, 2¼@2½c.; Tees, 2½@2¾c.; Steel Angles, 2·5@2·6c. American Beams and Channels, 3·3c., base from dock.

Steel Plates.—We quote: Tank, 2·85@3c.; Boiler and Ship Plates, 3@3¼c.; Flanges, 3½@3¾c.; Extra Flange and Fire-Box Plate, 4½@4¾c.

Merchant Steel.—There is no change from the Association rates. We quote: American Tool Steel, 7½@10c.; special qualities, 11@20c.; Crucible Machinery, 4@4·5c.; Bessemer and Open-Hearth Machinery and Spring, 2·7c.; Sleigh Shoe, 2·4c.; Open-Hearth and Bessemer Cutlery, 3·2c.

Plate Iron.—We quote: Common Tank, 2·45@2·55c.; Refined, 2 50@2·60c.; Flange Iron, 5·7@3¾c.; Extra Flange, 4·25@4½c.

Bar Iron.—We quote: Refined at 2·25@2·50c.; Common, 2@2·10c. There is nothing worthy of note in the market.

Cast-Iron Pipe.—We quote $30 for 36-inch pipe up to $37 per ton for 4-inch.

Rail Fastenings.—Prices advanced two weeks ago, and remain at our quotation. Spikes to 2·75c. a pound, delivered anywhere ; Angle Fish-Bars remain at 2¼c. ; Bolts and Nuts at 3¼@3½c.

Scrap.—The market is quiet. We continue to quote $24@$26 for Wrought Yard Scrap. Foreign Scrap is offered at $23@$23.50. We hear of sale of 300 tons American, from yard, at $25.50.

Old Rails.—Tees at from $ .3@$24, and for Double Heads at $24@$25.

Philadelphia. Feb. 18.

[From our Special Correspondent.]

Pig-Iron.—Foundry irons would sell better this week than they have if makers were willing and able to promise spring deliveries of certain brands at prices offered. Both buyers and sellers are further apart than usual ; the former take encouragement that prices may drop. To-day's quotations and selling prices show no actual change in the situation. No. 1 is is $22@$23 ; No. 2, $19@$21 ; Gray Forge, $18@$20. Mill irons are quieter than they have been for two or three weeks.

Muck Bars.—Business is quiet. Quotations, delivered, $36. Mills full.

Foreign Material.—Large sales are reported in Bessemer at $21.25@$21.50; Spiegel, $27.50@$28, offers at $27. Steel rail blooms are likely to weaken. Slabs $33@$34 quoted, offers $32.50.

Manufactured Iron.—Orders are falling off, but prices are very firm at from $2 to $2.30 according to quality and size of orders. Bessemer markets are excellent. The Association meets on Monday.

Skelp Iron.—Large orders are in sight at about $2.20@$2.45 for grooved and sheared.

Wrought-Iron Pipe.—The highest prices are paid when business can be accepted. Numerous new requirements are heard of.

Nails.—Business is a little slack, although there is very little disposition among makers to break faith with each other. Quotations, $2.40.

Plate and Tank.—Business running into several hundred tons is under consideration, and quotations are very firm. The main point just now is to get the stuff. Tank, 2·45c. ; Plate, 2·45@2·50c.

Structural Iron.—A fair run of business is admitted by manufacturers. There is no difficulty in the way over prices. Angles, 2·30c. ; and Beams and Channels, 3·30c.

Old Rails.—Large orders, reported at ten thousand tons, though brokers refuse to corroborate the rumor, have been placed for spring shipment, and prices have reacted slightly in favor of sellers, at $24.50 to $25 asked.

Steel Rails.—Every thing is quiet, at $40@$41. Small orders are dropping in, and some large late delivery contracts for Southern roads will shortly be heard of at something off highest prices.

Scrap.—Demand active, and prices firm, at $24.50 for Selected.

Pittsburg. Feb. 17.

[From our Special Correspondent.]

Notwithstanding the heavy transactions for some time past, there is still a fair jobbing demand. Most buyers have a reasonable good supply in hand, and are not compelled to enter the market for want of stock. At the same time, let holders shade prices a limited amount and they will find no difficulty in disposing of a few thousand tons. Such being the situation, appearances sometimes indicate a dull market when business does not justify the same. For No. 1 iron the same prices are demanded that were current at date of our last report ; in fact, some of the city furnaces show no anxiety to sell ; others are not offering, and report that they have none for sale. At the same time, a daily consumption of six thousand tons will soon exhaust the amount now in hands of consumers, who will then be under the necessity of laying in a further supply. In the face of these facts, to say the least, the decline, if any, will only be a limited one.

"Eastern views differ little from our own. While business seems to have slackened up, prices are firm in all lines except old rails and scrap material. Confidence is strong in the future of the market, as every line of production is sold up and ahead, and that the entire output for months will not allow an accumulation of stocks. This means practically a bare iron and steel market for some time to come. The weakness in old rails means strength to the market, because the great bulk of our old material is coming from abroad, and the lower the price the better." It looks like trouble among the coke men. The syndicate of the Connellsville region are in session in this city. The men demand 33⅓ per cent advance. This is refused, 5 per cent being offered. The decision will be waited for with considerable interest. Muck-Bar weaker. Old iron rails lower.

Coke or bituminous :	$	$
Foundry No. 1	21.50@22	00
Foundry No. 2	20.50@21	00
Gray F., No. 3	.20.50@20.75	
" " No. 4	.19.50@20.00	
White	.19.00@19.50	
Mottled	.19.50@20.00	
Silvery	19.00@20.00	
Bessemer	.22.25@22.50	
Charcoal :		
Foundry No. 1	.24.00@25.00	
Foundry No. 2	.23.00@24.00	
Cold-Blast	.27.00@30.00	
Warm-Blast	.24.00@25.00	
20 p. c. Spiegel	.@31.00	

	$	$
Muck-Bar	.35.50@36.50	
Steel Blooms	.34.50@36.00	
Steel Slabs	.33.00@35.00	
Steel Crop Ends	24.50@25.00	
St'l Bl'm Ends	.24.00@24.50	
Old Iron Rails	.27.50@29 00	
Old Steel Rails	.24.00@25.00	
No. 1 W. Scrap	.24.75@25.00	
No. 2 W. Scrap	.22.00@23.00	
Steel Rails	40.00@41.00	
" light sect's	.40.00@45.00	
Bar Iron	2 00@	..
Nails $2.50 net car lots.		
Steel Nails $2.50 net car lots.		

SALES SINCE LAST REPORT.

Tons.		
1000	Gray Forge, Coke and Coal Smelted Lake Ore	22.50 cash.
1250	Gray Forge, Coke and Coal Smelted Lake Ore	20.80 cash.
1000	B-ssemer, Coke and Coal Smelted Lake Ore	22,50 cash.
1000	Gray Forge, Coke and Coal Smelted Lake Ore	20.65 cash.
500	Gray Forge, Coke and Coal Smelted Lake Ore	20.65 cash.
100	No. 1 Foundry, all ore, Coke and Coal Smelted Lake Ore	22.75 4 mo.
1280	Nail Slabs, Steel Billets	35.25 cash.
500	American, Steel Billets	36.50 cash.
1500	March Muck-Bars	37.00 cash.
500	" "	36.75 cash.
500	Spot Muck-Bar	35.50 cash.
380	February Muck-Bars	36.75 cash.
150	Spot Muck-Bars	35.00 cash.
2000	Imported Ts. Old Iron Rails	27.35 cash.
200	Gray Forge, off grade Coke, Native Ore	40.00 cash.
100	No. 2 Foundry Charcoal	24.00 4 mo.
1200	American Steel-Wire Rods	46 25 cash.
1000	Wide Grooved Skelp Iron, per cwt.	2 47½ cash.
500	Small Grooved " "	2.32½ cash

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Feb. 18.

Statistics.

Production Anthracite Coal for week ended February 12th, and year from January 1st :

TONS OF 2240 LBS.	1887. Week.	1887. Year.	1886. Week.	1886. Year.
P. & Read. RR. Co.	149,029	827,428	200,819	1,079,318
L. V. RR. Co.	116,775	682,457	151,380	746,046
D., L. & W. RR. Co.	113,142	549,802	97,755	676,639
D. & H. Canal Co.	97,536	569,662	96 578	521,724
Penna. RR.	55,014	301,177	52,518	327,970
Penna. Coal Co	25,020	116,241	18,684	119,366
Total	556,625	3,046,767	617,734	3,471,663
Increase				
Decrease	61,109	424,296		

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period :

1882	3,119,322	1884	3,214,545
1883	3,552,821	1885	2,852,898

Production of Coke on line of Pennsylvania RR. for week ended February 12th, and year from January 1st :

Tons of 2000 pounds.

	1887. Week.	1887. Year.	1886. Week.	1886. Year.
Tyrone & Clearfield	215	1,539	.....	.....
Allegnany Region.	4,934	28,335	2,823	21,968
West Penn. RR.	2,101	12,632	2,116	11,714
Southwest Penn. RR	75,171	403 359	12,333	161,001
Penn. & W. Region	7,435	45 831	7,586	36,907
Monongahela	3,676	22,907	1,248	6,821
Pittsburg Region	.....	34	.....	.....
Snow-Shoe	1,096	6,211	935	4,663
Total	94,628	520,648	27,041	243,074

Production Bituminous Coal for week ended February 12th, and year from January 1st :

Tons of 2000 pounds, unless otherwise designated.

EASTERN AND NORTHERN SHIPMENTS.

	1887. Week.	1887. Year.	1886. Week.	1886. Year.
Phila. & Erie RR.	.....	.....	82	250
**Cumberland, Md.*	69,005	298,829	29,598	255,573
Barclay, Pa.	3,513	20,591	3,702	27,337
**Broad Top, Pa.*				
H. & Broad Top RR.	13,500	48,014	6,376	32,561
East Broad Top	.....	.....	.....	.....
Clearfield Region, Pa.				
Snow Shoe	4,111	22,494	3,138	17,774
Karthaus (Keating)	4,678	26 562	1,965	12,317
Tyrone & Clearfield	55,378	346,132	52,875	314,074
Alleghany Region, Pa.				
Gallitzin & Mountain	13,974	117,779	16,556	73,408
Pocahontas Flat Top Coal.				
Norf'k & West. RR.	25,243	133,084	12,609	88,571
Kanawha Region, W. Va.				
†Ches. & Ohio RR.	30,000	178,370	20.000	131,169
Total	212,492	1,191,855	146,901	953,034

* Tons of 2240 lbs. † Estimated.

WESTERN SHIPMENTS.

Pittsburg Region, Pa.				
West Penn RR.	6,063	41,486	4,477	27,705
SouthwestPenn. RR.	3,510	20,938	2,772	12,978
Pennsylvania RR.	4,406	28,660	5,763	28,622
Westmoreland Region, Pa.				
Pennsylvania RR.	26,331	175,402	33,140	156,483
Monongahela Region, Pa.				
Pennsylvania RR.	6,936	47,285	4,385	20,255
Total	47,246	313,771	50,537	246,043
Grand total	259,648	1,505,626	197,438	1,199,077

Anthracite.

Mr. John H. Jones, official accountant, furnishes the following statement of the anthracite coal tonnage for the month of January, 1887, compared with the same period last year. This statement includes the entire production of anthracite coal, excepting that consumed by employés, and for steam and heating purposes about the mines :

COMPANIES.	Jan., 1887.	Jan., 1886.	Difference.
Phila. & Reading RR.	500.391	700,173	Dec. 199,783
Central R. R. of N. J.	237,633	*	In. 237,633
Lehigh Valley RR.	409,633	446.497	Dec. 36,864
Del., Lack. & West. RR.	350,236	496,760	Dec. 146,524
Del. & Hud. Canal Co.	355,641	313.086	In. 42.555
Pennsylvania RR.	253,505	232,521	In. 20,983
Pennsylvania Coal Co.	79,233	83 586	Dec. 4,353
N. Y., L. E. & W. RR.	57,041	65,648	Dec. 8,606
Total	2,243,312	2,338,271	Dec. 94,958

* Included in tonnage of Philadelphia & Reading R. R.

The stock of coal on hand at tide-water shipping points, January 31st, 1887, was 475,448 tons ; on December 31st, 1886, 372,282 tons ; increase, 103,166 tons.

Although the strikers have been defeated for some time past, yet they have been, and are still, greatly embarrassing the coal trade. The movement of coal, however, has now reached such large proportions, that a number of concerns have coal to sell, over and above the demands on old orders. Yesterday the Lehigh Valley Company's coal handlers, at Perth Amboy, broke loose from the Knights of Labor and asked to be taken back at the company's own terms. During the week, the Reading Company resumed work at Elizabethport upon the terms of President Corbin's compromise. The Lehigh Coal and Navigation Company is said to have resumed at the same time and at the same place at the old rate of wages. The Boatmen's Union is still holding out, although the number of boats seeking employment is constantly increasing, and freight rates are showing a tendency to decline. During the week, the rates paid have been equal to 25 to 75 cents to this city. Some of the Erie canal boatmen, who are not members of the Boatmen's Union, are said to have made as much money during the past month as they usually make in six months.

The demand for coal is very good, and prices are quite firm, but still prices appear to be at the top, with a tendency to ease off some at a very early day. In fact, there is some disappointment in the trade because there is not more snap to it than there is. The mild weather, and the enforced economy in the consumption of coal, owing to the high prices asked by retailers, has considerably reduced the requirements.

Prices are irregular, and in some cases above the circular rates. Chestnut is in greater demand than any other size.

We quote ordinary free burning coal, net, f.o.b. vessels at shipping ports as follows :

Lump	$3.50@$3.75
Steamboat	3.50@ 3.75
Broken	3.55@ 4.10
Egg	3.80@ 4.10
Stove	4.00@ 4.25
Chestnut	4.00@ 4.25
Pea	2.75@ 3.00
Buckwheat	2.00@ 2.25
Dust	1.40@ 1.50

The general impression is that there will be a very good trade until April 1, while some of the leading men in the trade think that the transportation facilities are so limited on all of the roads that the trade will take good care of itself well into the summer. It is stated that an allotment will be made for March, and that the companies will be expected to equalize their outputs during the month. It is not thought, however, that the Reading Company will do much in this direction.

The Delaware, Lackawanna & Western Railroad Company reports that it secured for all coal sold f.o.b. vessels, at Hoboken, last month, an average price of $3.63 per ton, but it compromises with its shippers and charges them tolls at the rate of $1.70 per ton.

The average price received by this company in January of last year was $2.94 per ton; in 1885, $3.13, and in 1884, $3.72 per ton.

The Reading Coal & Iron Company had 111,653 tons of coal in stock at Port Richmond last Saturday, an increase for the week of 2474 tons. The entire stock of coal on hand at this point, at the end of last week, was 129,466 tons.

Bituminous.

The movement of bituminous coal is suffering much more from the strike than anthracite is. The shipments are mostly made from South Amboy, and the smaller concerns have been unable to do much up to the present time.

The strikers have made especial efforts to stop the shipments of the Berwind White Coal Mining Company, owing to the large number of steamship contracts which that concern has. This company, however, is working day and night, and is shipping up to its usual capacity, with new men entirely. It has been able to charter 18 boats, which, with those it owns, permits it to supply all pressing needs. The company has not delayed a steamer, which it had contracted to coal, during the entire strike, and has coal alongside of all of its steamers now. This company has had to make two very hard fights with its employees during the past year, in which it has been successful ach time, at a very large cost to itself, in meeting the demands on orders booked. During the miner's strike last year, the company purchased coal in Ohio to meet the requirements of its contracts. This company stands at no expense or effort to meet its contracts to deliver coal. We call attention to these facts for the consideration of the miners, especially. There are already evidences of coming trouble with the bituminous coal miners. This is showing itself in the Cumberland, Md., district, where the companies have informed the miners that an advance in wages will be made in March. The companies may be justified in making an advance of 5 cents per ton at that time, but no more. Some of the miners are talking of making demands of 25 to 35 cents per ton, and it is very doubtful if a contest can be averted. Should a strike occur in this district, it is not improbable that it may extend to the Clearfield and other districts. This is the time for the industrious miners to resolve that they will accept a moderate advance in wages and not permit their leaders to misguide them, and bring upon them a repetition of the misery and defeat which they have but so recently experienced. Although the price of this class of coal is temporarily high, it will not remain so long. The outlook is more favorable for this year than last, still the miners must remember that the railroads will demand their share of the advance in price, and it is but fair that the mining companies should have a portion, which will not be much.

There is practically no coal to spare over the requirements of contracts, so but an insignificant quantity is being sold. Ordinarily $4.25@$5 per ton alongside in this city is obtainable, although we have heard of an inferior quality sold at $3.25 f.o.b.

Cars are very scarce on the Pennsylvania road, and to a lesser extent on all the other roads. At Baltimore, we learn of $2.50 per ton f.o.b. having been paid during the week. Vessels at Baltimore and Philadelphia have been scarce, with a very good demand for them. The rates from both ports are about the same. To sound ports $1.85 is asked, and to Boston $2. No yearly contracts for bituminous coal have been made recently, and it is not thought that there will be before the beginning of next month.

Buffalo. Feb. 17.

[From our Special Correspondent.]

No change in prices of bituminous and anthracite coal or coke, excepting that Pea size anthracite coal brings $4.25 per net ton delivered, in consequence of its scarceness. "The retail hard coal trade is very satisfactory," says a member of the Coal Exchange, "business is conducted on business principles, and, therefore, harmony prevails." The stock of hard coal is anything but large, but yet ample for all the requirements of the trade here. Many orders for interior and western points are being slowly filled in consequence of the light supply of cars, and our local dealers are annoyed and embarrassed to a great extent, but "what cannot be cured must be endured" is an old and truthful adage.

The supply of soft coal continues quite limited in mount, and some varieties are difficult to obtain. Market of all kinds very strong and likely to continue so unless something unforseen occurs to change the labor and transportation questions.

Last week, in the Circuit Court, a suit was brought by Andrew Langdon & Co. against the Mechanics' & Traders' Insurance Company, of New York. The plaintiff claims to have had a contract for the insurance of all cargoes of coal leaving Buffalo by his direction during 1884. Late in the season, the company's agent at Buffalo refused the risk on the cargo of the Isaac May, hence to Prince Arthur's Landing. The damages sued for are $668.54. Decision not made at time of writing.

Railroad schedule rates sent out nowadays are generally written across with the words, "All rates subject to change, with or without any notice, at our option," and stamped thus: "All rates subject to the provisions of the Inter-State Commerce Bill." With regard to the advance in coal freights by railroads hence westward, the Secretary of the Buffalo freight committee says: "That he has not heard of any kicking against the raise," which went into effect on the 15th instant. He further stated in substance that the matter of freight charges is a question of supply of cars; if there had been more cars last summer, 50c. per ton more could have been obtained as easily as the prices paid. It is a common thing for competitive railroads to increase rates during the winter months, for the handling of freight is then more expensive than in the summer.

No lake charters for coal have been made here yet, as far as can be ascertained. There seems to be trouble ahead. Shippers will try to take every advantage, naturally, of the situation as presented from present standpoint. There is probably 75,000 tons vessel tonnage in port, and it is a question whether there will be that quantity of coal on hand at the opening of navigation. If not on hand, then may come competition among vessel men, and, as a consequence cutting of what may be deemed the fixed opening rate. This possibility may prevent shippers from making contracts now or until the last moment. Then, again, before navigation opens some idea may be ascertained as to the probable working of the Inter-State Commerce Bill, and this knowledge become a factor for good or evil to parties interested in lake freighting.

A vessel broker reports that contracts have been made for the delivery of 4,000,000 tons (?) of iron ore from the Lake Superior districts to various receiving points on the lakes. Great activity has prevailed during the past few days in freighting circles, but the quantity named seems extraordinarily large. As a specimen of the chartering, take the propeller Onoko, nine trips from Ashland, L. S., at $1.85 a ton; the vessel allowed to take coal *up* five trips. Some charters running to the first and middle of September were made at $1.70@$1.75 a ton. A propeller and consort contract all season from Ashland, $2 a ton.

Trip engagements from Escanaba to October 1st at $1.35; season, $1.40@$1.45; from Marquette to October 10th, at $1.60.

Several steel propellers, of mammoth size, are being constructed at various points on lakes Erie, etc.

Boston. Feb. 17.

[From our Special Correspondent.]

Business continues to be conducted in anthracite coal upon rather uncertain and unsteady lines, at this port. Buyers can get no guarantee of either delivery or price. Shippers promise to "do the best they can." Consequently there is not much demand for coal. This is not because there is an abundance on hand. As a matter of fact, the output is greater than receipts, and stocks are less than at the first of the month, but dealers are not very anxious, and so are disposed to wait until shippers can make more definite propositions. Such a result it is hoped and expected will come about very soon, as the labor troubles in New York seem to be virtually over. There will then be a good demand, particularly for broken, the stock of which is about exhausted in this market, owing to the demands from mill men and manufacturers who have run short. There has been a rather better state of affairs the other side of the Cape, as barges can be sent there safely, and there is more promptness in dispatching barges than is the case with vessels. Another cause which keeps retail dealers out of the market as long as they can is the high freight rates now prevailing. As high as $1.50 has been asked from New York, exclusive of discharging. This means about $5.75@$5.90 for stove coal laid down in Boston. No difficulty has been experienced here in unloading cargoes loaded in New York by non-union men. Several such cargoes have arrived. Dealers are confident that there will be no trouble at this port on that score.

There is very little bituminous coal moving. In fact, in a few cases f. o. b. prices have been advanced to $2.50 f. o. b., which amounts to a refusal of orders. Parties having coal to sell will accept $2.50 f. o. b. for cargo lots.

As above noted, in the case of New York, freights are very high and firm. We quote, exclusive of discharging: New York, $1.50; Philadelphia, $2; Baltimore, $1.90@$2; Newport News and Norfolk, $1.60@$1.75.

In this connection it may be noted that the steamer bought in Baltimore some months ago by Messrs. L. G. Burnham and C. A. Campbell—two large retail dealers in Boston—has just been put into commission under the name of "Shawmut," and has gone into the coal carrying service. She is now on her first trip to Newport News for soft coal. The steamer was the "Enchantress," a British tramp, and was wrecked off Frying-Pan Shoals. She is now as good as new, and stands her new owners a handsome profit if they chose to sell her to-day. At the recent trial trip down Boston harbor, about all the coal trade of Boston were in attendance, and had an enjoyable time. She will carry 2500 tons, and is expected to tow a barge containing as much more. Her two owners expect to use her exclusively in their own coal carrying.

Retail trade is fairly active at $6 for broken, $6.25 for Egg, and $6.50 for Stove. Franklin is held at $8.50.

Pittsburg. Feb. 17.

[From our Special Correspondent.]

The difficulty among the coal fraternity having been settled in most of the pools, work has been resumed. Boats are being loaded rapidly; the Ohio being in good navigable order, coal is being sent below as fast as mined; the shipments so far this week being 914,000 bushels. This will be increased before the end of the week. The rates are without quotable change, viz., afloat at second pool, 4¾@5c.; third pool, 3·80@4c.; fourth pool 3½@3⅝c. Railroad coal, 4½@5c.

Connellsville Coke.—The advance noted last week has been maintained. So far, consumers are expressing their dissatisfaction in strong terms; coke makers have promised to take the matter into consideration; what the result will be the future will tell. Blast-furnace, $2 f.o.b. cars at ovens; Foundry, $2.30; Crushed, $2.60. Rates on blast-furnace from the mines to Pittsburg, 88 cents a ton; to Mahanoy and Shenango Valley and Wheeling, $1.25; and to Chicago, $3.30.

FINANCIAL.

Mining Stocks.

NEW YORK, Friday Evening, Feb. 18.

Considerable business has been done in the mining market during the past week, and the transactions recorded show an increase of 137,355 shares as compared with the previous week. The prices held their own, but in a few instances there was a tendency for an upward movement. Though but little interest has been manifested in the market for some time past, there is no doubt that before long there will be a revival of business.

El Cristo attracted considerable attention owing to favorable reports, which, it is stated, have been received from the mines. On Monday, the stock was $2.25 and advanced to $2.75, the closing price to-day.

Phœnix opened at about $6, and advanced to $8.25 on Wednesday, but displayed a downward tendency toward the close of the week, when it was quoted at from $6.25@$6.87, with sales of 109,920 shares. The shares are not dealt in at the Consolidated Stock and Petroleum Exchange, but among the Unlisted Securities at the New York Stock Exchange. We notice this company editorially, and have several letters on another page concerning it.

Middle Bar was one of the most active stocks on the list, showing sales of 31,200 shares at prices which advanced from 57c. to 70c. on Wednesday, and have since declined to 63 cents again. Amador showed an upward tendency, and went from $1.25 to $1.50. Stanislaus was also higher, going from $1.80 to $2.15. Quicksilver Common was firm at from $7 t

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par value	Assessments. Total levied to date.	Assessments. Date and amount per share of last.		Dividends. Total paid to date.	Dividends. Date and amount per share of last.	
1	Adams, s L	Colo.	$1,500,000	150,000	$10	*			$555,000	Jan.	1887 .15
2	Alice, S. C.	Mont	10,000,000	400,000	25	*			750,000	Sept	1886 .06¾
3	Amie Con., S. L.	Colo.	5,000,000	500,000	10	*			330,000	Oct.	1883 .05
4	Amy & Silversmith, s.	Mon.		341,419					264,852	Dec.	1886 .10
5	Atlantic, C.	Mich	1,000,000	40,000	25	$280,000	Apl.	1875 $1.00	360,000	Jan.	1887 $1.00
6	Argenta, s	Nev.	10,000,000	100,000	100	295,000	July	1885 .10	40,000	Feb.	1880 .20
7	Aurora, I.	Mich.	1,000,000	40,000	25				40,000	Apl.	1887 1.00
8	Barbee & Walker, s.	Utah	1,000,000	100,000	10	*			60,000	Nov	1880 .10
9	Bassick, G. s.	Colo.	10,000,000	100,000	100	*			400,000	Mar.	1884 1.00
10	Belle Isle, s.	Nev..	10,000,000	100,000	100	140,000	May	1886 .10	300,000	Dec.	1879 .25
11	Belcher, G. s.	Nev..	10,400,000	104,000	100	2,217,335	Dec.	1885 .30	15,397,000	Apl	1876 1.00
12	Bellevue Idaho, s. L.	Idah.	1,250,000	125,000	10	26,250	Dec.	1883 10	200,000	Jan	1887 .10
13	Big B'nd Hydraulic, G	Dak..	1,000,000	200,000	5	*			216,000	Jan.	1887 .03
14	Black Bear, G.	Cal..	3,000,000	30,000	100	22,500	Dec.	1884 .25	885,000	May	1883 .20
15	Bodie Con., G. S.	Cal..	10,000,000	100,000	100	374,990	Jan.	1887 .50	1,602,572	Apl.	1885 .50
16	Bonanza Developm't	C &M	3,000,000	300,000	10				135,000	Oct.	1882 .15
17	Bonanza K'g, Cons.s.	Cal..	1,000,000	100,000	10	*			185,000	Feb.	1882 .10
18	Boston & Mont, G.	Mont	2,500,000	250,000	10	*			520,000	Jun	1886 .15
19	Breece, S.	Colo.	5,000,000	200,000	25	*			2,000	Feb.	1880 .01
20	Brooklyn Lead, L. S	Utah	500,000	50,000	10				102,000	Sept	1886 .05
21	Bulwer, G.	Cal	1,000,000	100,000	100	40,000	Oct.	1885 .20	175,000	Jan.	1884 .10
22	Caledonia, G.	Dak.	10,000,000	100,000	100	505,000	May	1885 .15	40,000	Feb.	1886 .10
23	Calumet & Hecla, C.	Mich	2,500,000	100,000	25	1,200,000			28,350,000	Nov.	1886 5.00
24	Carbonate Hill, s. L.	Colo.	2,000,000	200,000	10	*			80,000	Apl.	1884 .05
25	Caribou Con., s.	Colo.	1,500,000	150,000	10	*			50,000	Mch	1880 .10
26	Castle Creek, G.	Idah.	100,000	100,000	1				51,000	Oct..	1883 .03
27	Catalpa, s. L.	Colo.	3,000,000	300,000	10	*			270,000	May.	1884 .10
28	Central, C.	Mich	500,000	20,000	25	100,000	Sept	1861 .06	1,820,000	Feb.	1887 2.00
29	Christy,	Utah	10,000,000	100,000	100				10,000	Jun.	1885 .10
30	Chrysolite, s. L.	Colo.	10,000,000	200,000	50	*			1,660,000	Dec.	1884 .25
31	Colorado Central, s. L	Colo.	2,750,000	275,000	10	*			185 000	Feb.	1887 .05
32	Cons. Cal. & Va., G. s.	Nev..	21,600,000	216,000	100	108,000	Jan.	1885 .20	280,800	Feb	1887 .50
33	Con. Gold Mining, G.	Ga..	500,000	100,000	5	*			108,000	Nov.	1883 .02
34	Contention, s	Ariz.	12,500,000	250,000	50	*			‡2,587,000	Dec.	1884 .25
35	Crescent, s. L. G.	Utah	15,000,000	600,000	25	‡			210,000	Aug.	1886 .05
36	Crown Point, G. s.	Nev..	10,000,000	100,000	100	2,675,000	Feb.	1882 .25	11,588,000	Jan.	1875 2.00
37	Daly, s. L.	Utah		150,000					75,000	Feb.	1887 .50
38	Deadwood-Terra, G.	Dak..	5,000,000	200,000	25	*			§900,000	Jan.	1884 .10
39	Derbec B. Grav., G. s.	Cal..	10,000,000	100,000	100	90,000	Dec.	1881 .10	140,000	Jun.	1886 .10
40	Dunkin, s. L.	Colo.	5,000,000	200 000	25	*			920,000	Sept	1884 05
41	Elkhorn, G. s.	Mont	1,000,000	100,000	10	50,000	July	1883 .50	155,000	Jan	1887 .05
42	Eureka Con., G. s. L.	Nev..	5,000,000	50,000	100	500,000	July	1880 1.00	4,817,500	July	1882 .25
43	Evening Star, s. L.	Colo.	500,000	30,000	10	*			1,400,000	Nov	1883 .50
44	Excelsior, G.	Cal..	10,000,000	100,000	100	560,000	Sept	1885 1.00	875,000	Oct.	1880 .25
45	Father de Smet, G.	Dak..	10,000,000	100 000	100	200,000	Nov.	1878 1.00	1,125,000	Dec.	1885 .20
46	Franklin, C.	Mich	1,000,000	40,000	25	220,000	Jun.	1871	550,000	Dec.	1886 1.00
47	Freeland, G. S. C.	Colo.	5,000,000	200,000	25	*			190,000	July	1886 .10
48	Fresno Enterprise, G	Cal..	5,000,000	100,000	50				110,000	July	1882 .10
49	Garfield Le., G. s.	Nev.	500,000	100,000	5				12,000	Dec.	1883 .12
50	Gould & Curry, G. S.	Nev.	10,800,000	108,000	100	1,055,000	Sept	1886 .50	3,826,000	Oct.	1879 10.00
51	Grand Central, S.	Ariz.	1,000,000	100,000	10				625,000	Dec.	1882 .25
52	Grand Prize, S.	Nev.	10,000,000	100,000	100	570, 0	Apl.	1886 .50	495,000	Mar.	1881 .25
53	Granite, S.	Colo.	125,000	125,000	1				6,250	Mar	1883 .01
54	Granite Mountain, s.	Mont	10,000,000	400,000	25				1,800,000	Jan.	1887 .25
55	Green Mountain, G.	Cal..	1,250,000	125,000	10	*			212,000	Nov.	1881 .07½
56	Hale & Norcross, G. S	Nev..	11,200,000	112,000	100	4,97a,800	Oct.	1886 .40	1,598,000	Apl	1871 5.00
57	Hall-Anderson, G.	N. S.	150,000	150,000	1				7,000	Jan.	1882 05
58	Hecla Con., S. G. L. C.	Mont	1,500,000	30,000	50				1,122,000	Jan.	1887 .50
59	Hel'a Mg & Red, G.S.L	Mont	3,315,000	663,000	5	*			197,970	July	1886 .06
60	Holmes, S	Nev..	10,000,000	100,000	100	300,000	Sept	1885 10	75,000	Apl.	1886 .25
61	Holyoke, G.	Idah.	200,000	200,000	1				27 000	Feb.	1883 .10
62	Homestake, G.	Dak.	12,500,000	125,000	100	200,000	July	1878 1.00	3,743,750	Feb	1887 .20
63	Honorine, S. L.	Utah	500,000	250,000	2	25,000	Jun.	1883	87,500	Dec.	1886 .05
64	Hope, S.	Mont	400,000	8,000	50	*			158,252	Oct..	1884 1.50
65	Horn-Silver, S. L.	Utah	10,000,000	400,000	25	*			4,000,000	Nov.	1884 .50
66	Idaho, G.	Cal..	310,000	3,100	100				3,750,000	Jun.	1886 7.50
67	Ideal, S. L.	Colo.	1,500,000	150,000	10				15,000	Oct.	1886 .05
68	Illinois, S.	N. M.	100,000	100,000	1	*			25,000	Jan.	1887 .25
69	Independence, S.	Nev..	10,000,000	100,000	100	340,000	Oct.	1886 .20	225,000	Sept	1879 .25
70	Indian Queen, S.	Nev..	250,000	425,000	2				368,750	July	1883 .03
71	Invo, G	Cal..	500,000	100,000	5	*			45,000	Apl.	1882 .05
72	Iron Hill, S.	Dak.	2,500,000	250,000	10	82,500	Oct.	1885	112,500	Oct.	1886 .05
73	Iron-Silver, S. L	Colo.	10,000,000	500,000	50	*			1,800,000	Dec.	1886 .20
74	Jackson, G. S.	Nev,	5,000,000	50,000	100	10,000	Nov.	1880 .20	45,000	Oct.	1886 .10
75	Joculstita, S.	Mex.	2,500,000	250,000	10				1,200,000	Feb.	1885 .50
76	Kentuck	Nev..	3,000,000	30,000	100	342,000	Nov	1881 .30	1,600,000	Dec.	1886 .10
77	La Plata, S. L.	Colo	2,000,000	200,000	10	*			610,000	Sept	1882 .30
78	Leadville Cons., S. L.	Colo.	4,000,000	400,000	10	*			410,000	Oct.	1886 .05
79	Lexington, G. S.	Mont	4,000,000	40,000	100	*			565,000	Jan.	1885 2.00
80	Little Chief, S. L	Colo.	10,000,000	200,000	50	*			780,000	Mch	1885 .10
81	Little Pittsburg, S. L	Colo.	20,000,000	200,000	100	*			1,650,000	Mch.	1880 .50
82	Manhattan, s.	Nev.	5,000,000	50,000	100	150,000	July	1879 1.00	487,500	Feb	1887 1.00
83	Marguerite, G.	Cal..	500,000	25,000	20				18,750	Oct.	1882 .25
84	Marion Ballou, G	N. C	500,000	100,000					15,000	Jan.	1886
85	Martin White, S.	Nev..	10,000,000	100,000	100	1,150,000	Mar.	1886 .25	140,000	Dec.	1886 .25
86	Minnesota, C.	Mich	1,000,000	40,000	25	420,000	Apl.	1886 1 00	1,820,000	Mar	1876
87	Mono, G	Colo.	5,000,000	5 1,000	100	561,000	Jun.	1885 .50	12,500	Mar	1886 .25
88	Montana, Lt., G. s.	Mont	3,300,000	330,000	10	*			999,930	Jan.	1887 .02
89	Morning Star, s. L.	Colo.	1,000,000	100,000	10				675,000	Dec.	1886 .25
90	Moulton, s. G.	Mont	2,000,000	400,000	5	*			320,000	Dec	1886 .07½
91	Mount Pleasant, G.	Cal.	150,000	150,000	1	*			105,000	Mar.	1884 .10
92	Mt. Diablo, S.	Nev.	5,000,000	50,000	100	137,500	Jun.	1880 2.00	80,000	July	1885 .20
93	Napa, Q	Cal..	700,000	100,000	7				290,000	Jan.	1885 .10
94	Navajo, G. S.	Nev..	10,000,000	100,000	100	420,000	Jan.	1887 25	325,000	Feb.	1885 .25
95	N. Hoover Hill, G. s.	N. C.	300,000	120,000	2½	*			30,000	Dec.	1885 .06½
96	New York Hill, G.	Cal..	5,000,000	50,000	100	62,500	Oct.	1885 .15	215,000	Aug.	1882 .10
97	Northern Belle, S.	Nev..	5,000,000	50,000	100	425,000	Jan.	1884 8.00	2,400,000	Apl.	1883 50
98	North Belle Isle, S.	Nev..	10,000,000	100,000	100	200,000	Jan	1887 .50	80,000	Aug.	1881 .15
99	Ontario, S. L.	Utah	15,000,000	150,000	100				8,075,000	Feb.	1887 .50
100	Ophir, G. S.	Nev..	10,000,000	100,000	100	4,007,800	Dec.	1886 .50	1,595,000	July	1882 1.00
101	Original, S. C.	Mont	1,530,000	60,000	25	*			114,000	Oct..	1884 .05
102	Osceola, C.	Mich	1,250,000	50,000	25	480,000	Apl.	1876 1.60	1,022,300	Jan.	1887 1 00
103	Oxford, G.	N. S.	125,000	125,000	1	*			34,530	Oct.	1885 .02
104	Paradise Valley, G. S	Nev	10,000,000	100,000	100	47,000	Mar.	1882 .15	140,000	Nov.	1886 .10
105	Peacock, S. G. C.	N.M.	2,000,000	200,000	10	*			60,000	Nov.	1886
106	Pleasant Valley, G. S.	Cal..	10,000,000	100,000	100	40,000	Mar.	1884 .10	30,000	Dec.	1883 .05
107	Plutus, G. S. C. L.	Colo.	2,000,000	200,000	10	*			30,000	Feb.	1886 .10
108	Plymouth Con., G.	Cal..	5,000,000	100,000	50	*			1,875,000	Feb.	1887 .25
109	Prussian, S. L.	Colo	1,500,000	150,000	10				132,000	Jan	1883 .10
110	Quicksilver, pref., Q.	Cal..	4,300,000	43,000	100				849,650	Jan.	1887 1.50
111	" com., Q	Cal..	5,700,000	57,000	100				151,000	July	1882 .40
112	Quincy, C.	Mich	1,000,000	40,000	25	20 ,000	Dec.	1862	4,570,000	Jan	1887 4.00
113	Richmond, S. L.	Nev..	1,350,000	54,000	25	*			4,245,087	Dec.	1886 1.25
114	Ridge, C.	Mich.	500,000	20,000	25	220,000	Mar	1886 .50	100,000	Feb.	1880 .50
115	Rising Sun, S.	Dak..	750,000	150,000	5	*			52,000	May	1881 .07½
116	Robinson Con., S. L.	Colo.	10,000,000	200,000	50	*			585,000	Mar.	1886 .05
117	Robert E. Lee, S. L.	Colo	10,000,000	500,000	20				100,000	Dec.	1882 .10
118	Rooks, G.	Vt..	500,000	50,000	10	*			61,000	Apr	1885 .30
119	San Francisco, C.	Cal..	5,000,000	50,000	100	45,000	Sept	1880 .50	20,000	Feb.	1886 .05
120	Savage, S.	Nev..	11,200,000	112,000	100	6,156,000	Jun.	1886 .50	4,460,000	July	1889 3.00
121	Security L. Mg., Mfg.	Colo.	1,000,000	100,000	10	*			50,000	July	1884
122	Shoshone, G.	Idah.	150,000	150,000	1				7,500	Apl.	1883 .01
123	Sierra Buttes, G.	Cal..	225,000	22,500	10				1,438,964	Oct.	1886 .37
124	Sierra Grande, S.	N. M	2,500,000	500,000	5				860,000	Sept	1884 .25
125	Sierra Nevada, G. S.	Nev..	10,000,000	100,000	100	5,997,608	Jan.	1887 .25	102,000	Jan.	1871 1.00
126	Silver Cord, G. S. L.	Colo.	5,000,000	500,000	10				225,000	Nov.	1882 .25
127	Silver King, S.	Ariz.	10,000,000	100,000	100				1,825,000	Jan.	1887 .25
128	Silverton, G. S. L.	Colo.	2,000,000	200,000	10	*			76,000	Nov	1886 .02
129	Small Hopes Cons., S.	Colo.	5,000,000	250,000	20	*			2,562,500	Jan.	1887 .20
130	Smuggler, S. L.	Colo.	600,000	60,000	10				66,700	Aug.	1883 .25
131	Socorro, C	N. M.	250,000	2,500	100				4,000	Mch	1882 .00¼
132	South Yuba, G.	Cal..	2,000,000	0 000	50	*			150,000	Oct.	1881 .75
133	Spring Valley, G.	Cal..	200,000	2 0 000	1	50,000	Oct.	1886 .25	50,000	Jan.	1881 .25
134	Standard, G. S.	Cal..	10 000,000	1 0,000	100	25,000	Oct.	1884 .25	4,425,000	Mar.	1884 .25
135	Stormont, S.	Utah	500,0 0	500,000	1	*			155,000	Nov.	1881 .05
136	St. Joseph, L.	Mo..	1,500,000	150,000	10	*			724,000	Dec.	1886 .20
137	Syndicate, G.	Cal..	10,000,000	100,000	100	38,729	July	1882 .15	48,308	Sept	1885 .10
138	Tip Top, S.	Ariz	10,000,000	100,0 0	100	250,000	Sept	1883 .25	100,000	Nov.	1881 .20
139	Tombstone, G. S. L.	Ariz	12,500,000	500,000	25	*			1,250,000	Apl.	1882 .10
140	True Fissure, G. S. L.	Utah	1,500,000	150,000	10	*			75,000	Jun.	1883 .15
141	United Verde, C.	Ariz.	3,000,000	300,000	10	*			97,500	Feb.	1884 .20
142	Valencia, M	N. M.	150,000	1,500	100	*			37,500	Apl	1886 2.50
143	Viola Lt., S. L.	Idah.	753,000	150,0 0	5	*			55,750	Feb.	1887 .12½
144	Vizina, S.	Ariz.	5,000,000	200,000	25	*			140,000	Apl.	1882 .10
145	Yankee Girl	Colo	2,500,000	250,000	10				1,075,000	Jan.	1887 .05
146	Yellow Jacket, G. S.	Nev	12,000,0	12 ,000	100	5,44 ,000	Dec.	1885 .75	2,184,000	Aug.	1871 1.50
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NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par Value.	Assessments. Total levied to date.	Assessments. Date and amount per share of last.		
1	Agassiz Cons., S. L.	Colo.	$2,500,000	50,000	$50	*			
2	Albion, S. L.	Nev..	15,000,000	150,000	100	$577,000	July	1883	.50
3	Allouez, C.	Mich	2,000,000	80,000	25	240,000	Feb.	1884	.50
4	Alpha Con., G. S.	Nev..	3,000,000	30,000	100	445,000	Jan.	1887	.50
5	Alta, S.	Nev..	10,080,000	100,800	100	2,027,000	Feb.	1887	.50
6	Amador, G.	Cal..	400,000	200,000	2	*			
7	American Flag, S.	Colo.	1,250,000	125,000	10	300,000	Jun.	1877	.25
8	Anglo-Montana, Lt.	Mon.	600,000	120,000	5				
9	Appalachian, Lt., G.	N. C.	1,500,000	300,000	5				
10	Aspen Mg. & S., S. L.	Colo.	2,000,000	200,000	10				
11	Barcelona, G.	Nev..	5,000,000	200,000	25	*			
12	Battle Creek, G.	Dak.	5,000,000	200,000	25				
13	Bear Creek	Cal..	300,000	300,000	1				
14	Bechtel Con., G.	Cal..	10,000,000	100,000	100	173,500	Jan.	1883	.10
15	Belmont, S.	Nev..	5,000,000	50,000	100	735,000	Apl.	1886	.10
16	Best & Belcher, G. S	Nev.	10,080,000	100,800	100	1,748,590	Sept	1886	.50
17	Big Pittsburg, S. L.	Colo.	20,000,000	200,000	100	*			
18	Bi-Metallic, S.	Mon.	5,000,000	200,000	25	*			
19	Black Jack, G.	Cal..	250,000	100,000	2½				
20	Bonanza Chief	Mon	1,000,000	1,000,000	1	*			
21	Bondholder	Colo	500,000	200,000	2½				
22	Boston Con., G	Cal..	10,000,000	100,000	100	170,000	Nov	1883	.25
23	Bradshaw, S.	Ariz.	2,250,000	225,000	10				
24	Brunswick, G.	Cal..	2 000,000	400,000	5	*			
25	Buckeye Common	Colo.	2,000,000	400,000	5	*			
26	Bull Domingo, S. L.	Colo.	10,000,000	200,000	50	*			
27	Bullion, G. S.	Nev..	10,000,000	100,000	100	5,000,000	Jan.	1887	.40
28	Bve and Bye	Ariz.	1,000,000	100,000	10	*			
29	Calaveras, G.	Cal..	500,000	500,000	1	*			
30	Carisa, G.	Wy	500,000	100,000	5	*			
31	Catskill, S.	Nev..	1,500,00	300,000	5				
32	Cen Contin'l, G. S. L.	C.&A	2,000,000	200,000	10	*			
33	Charles Dickens,	Idah.	1,250,000	250,000	5				
34	Cherokee, G.	Cal..	1,500,000	150,000	10				
35	Chollar, S.	Nev..	11,200,0 0	112,000	100	1,096,000	Nov	1886	.50
36	Cinnamon Mt., G. S	Colo.	750,000	150,000	5	*			
37	Climax, S. L	Colo.	2,000,000	200,000	10	*			
38	Colorado No. 2, S. L	Colo.	100,000	10,000	10				
39	Con. Imperial, G. S.	Nev..	50,000,000	500,000	100	1,100,000	Aug.	1886	.10
40	Con. Pacific, G.	Cal..	6,000 000	60,000	100	174,000	Feb.	1886	.15
41	Cons Silver, S	Mo..	2,500,000	250,000	10				
42	**Cop. Queen Cons, C.	Ariz	1,400 000	140,000	10				
43	Courtlandt	Colo	500,000	50,000	10				
44	Crescent, S. L.	Colo.	3,000,000	300,000	10	*			
45	Crocker, S.	Ariz.	10,000.000	100,000	100	65,000	May	1886	.20
46	Crowell, G.	N. C	500,000	5 0,000	1				
47	Dahlonega, G.	Ga..	250,000	250,000	1	*			
48	Dandy, S.	Colo.	5,000,000	500,000	10				
49	Dardanelles, G.	Cal..	1,000,000	100,000	10				
50	Decatur, S.	Colo.	1,500,000	300,000	5	*			
51	Denver City, S. L.	Colo.	5,000,0 0	500,000	10	*			
52	Denver Gold	Colo.	300,000	60,000	5	*			
53	Deseret, G. S.	Utah	500,000	50,000	10	*			
54	Dunderberg, S.	Colo.	1,500,000	150,000	10	*			
55	Durango, G.	Colo.	500,000	500,000	1	*			
56	Durango T.	Mex	120,000	1,200	100				
57	Eastern Dev. Co., Lt.	N. S.	1,500,000	150 000	10	990,000	Mar.	1886	1.60
58	El Cristo, G. S.	U.S.C	1 000,000	500,000	2				
59	Empire Lt., G.	Mon.	5 0,000	150,000	5				
60	Empire, S.	Utah	10,000,000	100,000	100				
61	Enterprise, S. L.	Colo.	800,000	80,000	10	*			
62	Eureka Tunnel, S. L.	Nev..	10,000,000	1 0,000	100	*			
63	Exchequer	Nev.	10,000,000	100,000	100	860,000	Oct.	1886	.20
64	Gold Placer, G.	Colo.	5,000,000	200,000	25	229,314	Dec.	1885	.25
65	Goodshaw, G.	Cal..	10,000,000	100,000	100	*			
66	Grand Belt, C	Tex.	12,000,000	120,000	100				
67	Grand Duke	C lo.	800,000	80,000	10				
68	Gregory-Bobtail, G.	Colo.	550,000	550,000	1	*			
69	Gregory Con., G.	Mon.	3,000,000	300,000	10				
70	Harlem M. & M. Co, G.	Cal..	1,000,000	200,000	5				
71	Head Cent. & Tr. s. G	Ariz.	10,000,000	100,000	100				
72	Hidalgo, S.	Mex.	200,000	20,000	10				
73	Highland, C.	Mich	500,000	25,000	25				
74	Hortense, S.	Colo.	2,000,000	200,000	10				
75	Iron Gold & Silver, S	N. M.	2,000,000	200,000	10				
76	Iroquois, C	Mich	1,250,000	50,000	25				
77	J. D. Reymert	Ariz	10,000,000	100,000	100	*			
78	Julia Cons., G. S.	Nev..	11,000,0 0	110,000	100	1,438,000	Nov	1886	.10
79	Kearsarge, C.	Mich	1 250,000	50,000	25	100,000	Apl.	1886	5.00
80	Laclede	N. M.	2,000,000	200,000	10				
81	Lacrosse, G.	Colo.	1,000,000	100,000	10	*			
82	Lee Basin, S. L.	Colo.	5,000,000	500,000	10	*			
83	Leviathan, S.	Nev..	10,000,000	100,000	100	380,000	Sept	1886	.25
84	Lucerne, S.	Colo.	5,000,000	500,000	10	*	Jan.	1886	.10
85	Mammoth Bar., G.	Cal..	10,000,000	100,000	100	50,000	Dec.	1881	
86	Mariposa pref., G.	Cal..	5,000,000	50,000	100	1,687,500	Feb.	1883	.25
87	" common, G.	Cal..	10,000,000	100,000	100	1,975,000	Dec.	1881	.20
88	May Belle, G.	Cal..	10,000,000	100,000	100	94,000	Mar.	1886	.15
89	Mayflower Gravel	Cal..	1,0 0,000	100,000	100	135,000	Jan.	1887	.25
90	Mexican, G. S	Nev..	10,000,000	100,800	100	2,500,000	Jan.	1887	.25
91	Middle Bar, G.	Cal.	400,000	200,000	2	*			
92	Mike & Starr, S. L.	Colo.	1,000,000	200,000	5	*			
93	Miner Boy, G. S. L.	Colo.	5,000,000	500,000	10	*			
94	Miller	Nev.	5,000,000	200,000	25				
95	Moose Silver, S.	Colo.	3,000,00	300,000	10	*			
96	Nachoochee, Lt., G.	Ga..	1,000,000	200,000	5				
97	New Germany, G	N. S.	100,000	100,000	1	*			
98	New Pittsburg, S. L	Colo	2,000,000	200,000	10	*			
99	North Standard, G.	Cal..	10,000,000	100,000	100	20,000	Nov		
100	Noonday	Cal..	600,000	60,000	10	208,000	Dec	1881	.10
101	Old Dominion, C.	Ariz.	3,000,000	300,000	10				
102	Oriental	Nev..	2,000,000	200,000	10				
103	Oriental & Miller, S.	Nev..	10,000,000	400,000	25				
104	Overman, G. S.	Nev..	11,520,000	115,200	100	3,736,880	Jan	1887	.30
105	Parrott, C.	Mon.	1,800,000	180,000	10				
106	Park, S.	Utan	2,000,000	200,000	10				
107	Peer, S.	Ariz.	10,000,000	100,000	100	135,000	Nov	1886	.10
108	Peerless, S.	Ariz.	10,000,000	100,000	100	295,000	Nov	1886	.20
109	Phœnix	Ariz.	500,000	500,000	1				
110	Potosi	Nev..	11,200,0 0	112,000	100	1,112,000	Nov	1886	.30
111	Puritan, S. G.	Colo	1,500,000	150,000	10	*			
112	Quin y	Colo.	3,000,000	300,000	10				
113	Rappahannock, G. S.	Va..	250,000	250,000	1	*			
114	Red Elephant, S.	Colo	500,000	500,000	1	*			
115	Rollins, G. S.	Colo.	5,000,000	200,000	25	*			
116	Ropes, G. S.	Mich	2,000,000	80,000	25	63,200	Mar	1886	.10
117	Security, S.	Colo.	10,000,000	1,000,000	10				
118	Sheridan	N. M.	2,000,000	200,000	10				
119	Sonora Con.	Mex.	5,000,000	200,000	25	*			
120	South Bulwer, G	Cal..	10,0 0,000	100,000	100	100,000	May	1881	.25
121	South Hite	Cal..	10,000,000	100,000	100	195,000	Jan.	1883	.05
122	South Pacific	Cal..	500,000	100,000	5				
123	Stanislaus, G	Cal..	2,000,000	200,000	10				
124	State Line, S.	Nev..

NEW YORK MINING STOCK QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Feb. 12.		Feb. 14.		Feb. 15.		Feb. 16.		Feb. 17.		Feb. 18.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alice, Mon											1.25		200
Argenta, Nev													
Bassick, Colo													
Belle Isle, Nev					.46	.32	.40	.35	.39	.35	.40	.35	3,900
Bodie Cons., Cal	2.00		2 25	1.90			.50						225
Breece, Colo													100
Bulwer, Cal					1.50								500
Caledonia, Dak			1.25										100
Chollar, Nev													
Chrysolite, Colo													
Colorado Cent'l, Colo			2.75	2.60									400
Cons. Cal. & Va., Nev			20,00		22.50		22.00		21.75	21.63			528
Crown Point, Nev													
Deadwood, Dak	2.10												100
Dunkin, Colo													
Eureka Cons., Nev	7.13												10 0
Father de Smet, Dak													
Freeland, Colo	.75												100
Gold Stripe, Cal													
Gould & Curry, Nev									5.25				140
Green Mountain, Cal													
Hale & Norcross, Nev			5.00				14.50	13.50					200
Homestake, Dak													390
Horn-Silver, Ut			1.50				1.45						200
Independence, Nev									.25				100
Iron Hill, Dak					2.00		2.00						500
Iron Silver, Colo													
Leadville C., Colo													
Little Chief, Colo					.28		.29		.28				500
Little Pittsburg, Colo													
Martin White					.55	.50							400
Moulton, Mont													
Navajo, Nev	1.00	.93	1.00	.95	.90		1.00	.95					2,700
North Belle Isle, Nev							4.75	4 35	5.00	4 95	5.00		1,050
Ontario, Ut							26.00	25.00					100
Ophir, Nev			12.00		13.12								200
Plymouth, Cal							17.00				17.00	16 87	400
Quicksilver Pref., Cal													
" Com., Cal	7.25	7.00			7.25	7.13	7.25		7 13				797
Robinson Cons., Colo													
Savage, Nev													
Sierra Nevada, Nev			5.13		5.50	5.25							400
Silver King, Ariz											7.50		50
Standard, Cal			1.20										100
Stormont, Ut							.12		.11				400
Yellow Jacket, Nev			4.50										50

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Feb 12.		Feb. 14.		Feb. 15.		Feb. 16.		Feb. 17.		Feb. 18.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Amador, Cal	1.30	1.25	1.40	1.35	1.40		1.45	1.40	1.45		1.50	1.40	4,500
Am. Flag, Colo													
Barcelona, Nev							.20		.20				1,600
Bechtel Con., Nev													
Belcher, Nev													
Best & B'licher, Nev					10.87	10.50			10.75	10.00			235
Big Pittsb'g, Colo													
Bullion, Nev													
Bull-Dom'go, Colo													
Castle Creek, Id	.13												1,400
Central Ariz., Ariz	.15	.11			.10		.10						2,600
Columbia & Beaver													
Cons. Imperial, Nev									1.40				100
Con. Pacific, Cal			.30										100
Durango													
Decatur, Colo													
El Cristo, U. S. Col	2.65	2.55	2.58	2.25	2.60	2.50	2.60	2.50	2.70	2.60	2.75	2.70	12,700
Gold Placer													
Goodshaw, Cal													
Harlem, Colo													
Holyoke	.07	.04	.07	.05	.06		.06		.06		.06		25,300
Julia, Nev					1.10				1.00				300
Justice, Nev													
Kossuth, Nev					.14								300
Lacrosse, Colo									.12				500
Mexican, Nev					8.00				8.00				300
Middle Bar, Cal	.59	.57	.66	.57	.65	.64	.70	.64	.65	.61	.69	.63	31,200
Mono, Cal					2.25								100
New Germany, N.S.			.52	.51	.52		.51	.48	.49		.50		2,700
New Pittsb'g, Colo													
North Stand'd, Cal													
N. Horn-Silv'r, Ut													
Pri'nt'l & Mil'r, Nev	.17		.17								.16		500
*Phœnix, Ariz	7.00	6.00	7.87	6.50	7 87	7.00	8.25	7.37	7.12	6.12	6.87	6.25	109,920
Potosi, Nev													
Rappahann'k, Va	.16	.15	.16	.15	.15				.15		.15		5,300
Red Eleph't, Colo			.16	.05									1,500
" 2 and 3													
Security, Colo	6.00		5.87		5.75	5.25	5.75		5.63				1,500
Silver Cliff, Colo	.15		.15		.16	.15	.15	.14	.15	.13			4,900
Silver Hill													
Sonora Con., Mex													
Stanislaus, Cal	1.90	1.80	1 95		2.00	1.95	2.10	2.05	2.15	2.10	2.15	2.05	3,600
State L'e, 1 & 4, Nev			.03				.04		.04				1,000
" Nos. 2 & 3, Nev							.04						100
Sutro Tunnel, Nev	.20		.21	.20	.21	.20	.20	.18	.20	.18	.19	.18	31,700
Taylor Plumas, Cal	.08		.08	.06			.08		.08	.07	.07		26,600
Tioga, Cal													
Unadilla, Colo													
Union Cons., Nev			4.50										150
Utah, Nev													

* Dealt in at the New York Stock Exchange, Unlisted Securities.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	Feb. 11.		Feb. 12.		Feb. 14.		Feb. 15.		Feb 16.		Feb. 17.		SALES.
Amie													
Allouez	2.00		2.00		2.00		1.90		2.00		2.00		1,000
Atlantic													
Bodie													
Bonanza D	1.62		1.75		1.62		1.62		1.62		1.62	1.58	1,900
Boston & Montana			3.75	3.50							3.50		350
Breece							42½						100
Calumet & Hecla	215	214					215	214	215		215		86
Catalpa			32½		32½				37½	32½	32½		2,200
Central													
Chrysolite											67½		100
Con. Virginia													
Dunkin					.37		.37		.36	.30	.36		2,400
Eureka													
Franklin							13.00		12.62				135
Freeland													
Honorine													
Kearsarge													
Little Chief													
Osceola	22.50	22.25	22.25		22.50		22.25		22.25		22.50		327
Pewabic					2.25								100
Quincy	53.00		53.00		52.00		52.50				53.00	52.00	96
Robinson													
Security	6 25	6.12	6.25	6.00	6.75				5.62				1,000
Silver King			7.50										200
Standard													
Stormont							.12		.12				500

NAME OF COMPANY.	Feb. 11.		Feb. 12.		Feb. 14.		Feb. 15.		Feb. 16.		Feb. 17.		SALES.
Alma													
Arnold													
Bijou													
Blue Ridge	.21		.21		.21		.20		.21		.21		2,000
Bowman Silver	.08	.07	.08		.08		.08		.08		.10	.09	6,500
Cliff													
Con. Pacific													
Crescent	.12		.12½		.12				.12½				1,200
Cusi			.40				.38		.40				400
Edna													
Fern													
Gem													
Humboldt													
Huron			2.00										50
Mesnard													
Mona													
Napa													
National							1.00						100
Ora													
Oriental & Miller	.18		.18		.18								1,600
Plato													
Ridge													
Rappahannock													
Sutro Tunnel													
Tamarack											.95		10
Ute													
Washington													

New York: Dividend shares sold, 16,520. Non-dividend shares sold, 269,205. Total New York, 285,725.
Boston: Dividend shares sold, 10,494. Non-dividend shares sold, 11,860. Total Boston, 22,354.

COAL STOCKS.

NAME OF COMPANY.	Par value of shares.	Feb. 12.		Feb. 14.		Feb. 13.		Feb. 16.		Feb. 17.		Feb. 18.		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Barclay Coal														
Cameron Coal	50	47	46	46	45¾	45⅞		45½	45	45	44¾	45		2,200
Col., C. & I	100	39½		39	38½			38½	38	38	37¼	38		1,345
Ches. & O. RR	100													
*Chic. & Ind. Coal RR		53½	53	54	53½	52	52	‡85½	85½	85½	85½			1,300
Consol. Coal	100													
Cumb. C. & I	100													
Del. & H. C	100	103¼	103	103⅜	103⅜	102¼		102⅞		102½	102¼	102⅝	102⅜	3,915
D., L. & W. RR	50	137⅝	136⅞	137½	136	136½	135¾	136⅞	136½	136¾	135¼	136½	135¼	132,470
Elk Lick Coal Co														
Hocking Valley	100	36⅞	36	36¼	36	36	35½	36½	36	35⅞	35½	36		2,900
Lehigh C. & N.†	50			51	50¾	50¾	50½	50⅝	50½	50⅝	50½			334
Lehigh Valley RR.†	50	56		56		56¼	56	56⅛	56	56¼				226
L. & W. C. & I. Co														
Maryland Coal	100													
Montauk Coal	100													
Morris & Essex	50					141¾		141		140½		140		220
New Central Coal	100	17½		17½										200
N. J. C. RR	100	70½	69⅞	70⅝	69⅝	69⅞	69¼	71½	69¼	71½	70⅞	71⅛	70¼	42,665
N. Y. & S. Coal	50													
N. Y., Susq. & Western	100	13¾	12⅝	14½	13	13½	13	13½	13⅛	13	12⅞	13	12⅝	24,480
Do. pref	100	38	35	38½	36¾	37⅝	36½	37½	37	36¾	36½	36½	36⅛	25,608
N. Y. & Perry C. & I	100	70¼	70⅛	70⅝		70½	70¼	70⅝				68		1,160
Norfolk & Western R R	100			21¼	21			21½	21					720
Do. pref	100	48⅝	48¼	48⅝	48	48	47⅞	47⅞	47¼	47¼		47¾	47½	5,720
Penn. Coal	50													
Penn. RR.†	50	56¼	56	56¼	56	56	55⅜	56		56	55⅛			3,073
Ph. & R. RR.**	50	38¾	38	38⅝	37⅝	38⅛	37⅛	38¾	38¼	38⅝	37⅝	38¼	37⅛	286,791
Spring Mountain	50													
Tennessee C. & I. Co	100	48¾	48½	48		47	45	46¾		46		47½		1,410
Westmoreland Coal†	50													

** Of the sales of this stock, 43,124 were in Philadelphia, and 208,322 in New York.
† The quotations for these stocks are not percentage, but actual price.
* Dealt in at the New York Stock Exchange, Unlisted Securities.
‡ Preferred stock.

Total sales, 536,737.

San Francisco Mining Stock Quotations.

COMPANY.	CLOSING QUOTATIONS. Feb. 11.	Feb. 12.	Feb. 14.	Feb. 15.	Feb. 16.	Feb. 17.
Albion						
Alpha						
Alta	1.25	1.25	1.37½	1.37½	1.25	1.37½
Argenta						
Bechtel						
Belcher						
Belle Isle						
Best & Belcher	10.00	9.87½	10.50	10⅛	10⅛	10.00
Bodie		2.00	2.00	2.00	2.00	2.00
Bulwer		1.12½		1.12½	1.12½	1.25
Chollar	7.37½		7.87½	7.87½	8.00	8.00
Con. Cal. & Va		20.00	21.00	20.50	20.75	20.25
Con. Pacific	.25	.30		.30		.35
Crown Point	3.50	3.75	3.87½	3.75	4.12½	3.87½
Eureka Cons	7.00		7.00	6.75	7.00	6.87½
Gould & Curry	4.87½	1.87½	5.25	4.87½	5.25	5.00
Grand Prize						
Hale & Norcross	5.37½	5.25	5.75	5.25	6.00	6.00
Martin White						
Mexican	6.75	6.75	7.62½	7.25	7.37½	7.12½
Mono	2.50	2.50	2.25	2.50	2.50	
Mount Diablo				4.00		4.00
Navajo	.95	.95	.90	.90	90	.95
Ophir	12.00	11⅞	12.75	12½	12⅝	12½
Potosi	8 12½	8.25	8.37½	8.12½		8.12½
Savage	6.00	6.12½	6.00	5.62½	6.00	6.12½
Scorpion						
Sierra Nevada	4.75	5.00	5.25	5.00	5.37½	5.00
Sutro Tunnel						
Tip Top						
Union Cons	4.25	4.37½	4.37½	4.52	4.50	4.25
Utah	6.50	6.25	6.87½	6.75	7.00	7.25
Yellow Jacket	4.75	4.62½	5.50	5.00	5.25	5.62½

$7.25. Plymouth Consolidated shows a few sales at from $17 to $16.87. Taylor Piumas showed a large business at from 6 to 8 cents. Little was done in the Bodies, which ruled as follows: Bodie, at from $2.25 to $1.90; Bulwer, at $1.50; Standard, at $1.20, and Mono, at $2.25.

The stock of the Security Mining & Milling Company received but little attention at the Consolidated Stock and Petroleum Exchange, where dealings of only 1590 shares were recorded at prices ranging from $6 to $5.25, closing at $5.63. At the New York Stock Exchange, where the stock is quoted among the unlisted securities, more interest was displayed.

In the other Colorado stocks a few sales are recorded. Little Pittsburgh sold at from 28@29c.; Freeland, at 75c,; Colorado Central, at from $2.60@$2.75; Breece, at 50c.; La Crosse, at 12c.; and Silver Cliff, at from 16@13c.

The report that a new smelter is to be erected at the works of the Iron Hill Mining Company, which will greatly increase the production, has advanced the stock to $2. Homestake was quiet at from $13.50@$14.50; Deadwood-Terra at $2.10; and Caledonia at $1.25.

Horn-Silver was quiet at from $1.50@$1.45: Ontario, at $25@$26; and Stormont, at 11 and 12 cents.

Rappahannock was active at 15 and 16 cents.

Alice shows one sale at $1.25.

Castle Creek was neglected, and sales were only made on Saturday at 13 cents.

New Germany ruled at from 40@50c.

A sale of fifty shares of Silver King was made at $7.50.

Consolidated California & Virginia advanced from $20 to $22.50, but towards the close of the week declined to $21.63; Ophir was higher, going from $12 to $13.12; Sierra Nevada from $5.13 to $5.50; Best and Belcher declined from $10.87 to $10; Mexican remained at $8; Union Consolidated at $4.50; Yellow Jacket at $4.50; and Hale & Norcross at $5. A large business was again done in Sutro Tunnel, of which some 31,700 shares changed hands at from 21 to 18 cents, that being the closing price. Eureka shows transactions only on Saturday, selling then at $7.13. The Tuscarora stocks were firm. North Belle Isle advancing from $4.35 to $5; Navajo, from 90c. to $1. Belle Isle declined from 46c. to 32c. on Tuesday, but sold again to-day at from 35c. to 40c. The "Cats," State Line, 1 and 4 and 2 and 3, had some fun at 3@4c.

The petition of the stockholders for leave to intervene and defend against the foreclosure of their property in the suit pending in the United States Circuit Court in Nevada has been submitted to Judge Sabin at Carson City by their counsel, Theodore Sutro, of New York, and Samuel M. Wilson and Edmund Tanszky, of San Francisco. The court granted a stay of proceedings until March 2, to enable counsel to submit further arguments.

Coal Stocks.

The week under review has developed a good deal of weakness in the stock market, and a large amount of realizing has undoubtedly taken place. The large arrival, from Europe, of stocks sold about two or three weeks ago, under the war scares, is said to have somewhat embarrassed the bull pools and caused them to part with a portion of their loads. The increase in the item of loans in the bank statement, last week, of over $12,000,000 for two weeks, was looked upon as indicating that the pools were getting in deep, and that the public was not buying stocks. At the close of the market to-day, the feeling was very uncertain, with a tendency to bearishness. There is a desire on the part of conservative operators to do as little as possible in the stock market before the German elections, which take place on Monday, are decided, and it is indicated what construction the European financiers put upon the result. In the meantime, regular traders in railroad stocks are showing an inclination to take "flyers" in mining stocks. The favorites are the Comstocks, Phœnix, and the Security Mining Company. James R. Keene is a great bull on the latter, and says the old Silver Cliff, which is one of the company's mines, has developed a big bonanza. The regular Wall street men are gambling in these stocks because the fluctuations are about as great as in railroad stocks, while, if they are wiped out, their losses are circumscribed.

The coal stocks have acted as well as any other group during the week, but have not had any special feature. The Corbin party is admitted to have secured control of Jersey Central, and the close manner in which that stock is held is supposed to account for its strength.

The following securities were sold at auction in this city on the 16th inst.: $2000 Delaware & Hudson Canal Co. 7 per cent registered bonds, due 1891, 110; $1000 Morris & Essex R. R. Co., 1st mortgage 7 per cent bonds, due 1914, 142¾; $1000 Delaware & Hudson Canal Co. 7 per cent registered bond, due 1891. Interest January and July, 109⅝; 200 shares New Central Coal Co., 17⅛; 60 shares Alabama Mineral Land Co., 115½.

Meetings.

The annual and special meetings of the following companies will be held at the times mentioned:

Cusihuiriachic Mining Company, No. 82 Broadway, New York City, February 24th, at twelve o'clock M.

New Pittsburg Mining Company, No. 23 Nassau street, New York City, on the 24th inst., at twelve o'clock M.

Dividends.

Homestake Mining Company, of Dakota, has declared a dividend, No. 103, of twenty cents per share, or $25,000, payable on the 25th inst. at Messrs. Lounsbery & Co.'s, 15 Broad street, New York.

Ontario Silver Mining Company, of Utah, has declared a dividend, No. 129, of fifty cents a share, or $75,000, payable on the 28th inst., at Messrs. Lounsbery & Co., 15 Broad street, New York.

Assessments.

Company.	No.	When levied.	Delinquent in office.	Day of sale.	Amount.
Alpha, Nev	21	Jan. 12	Feb. 17	Mar. 10	.50
Alta, Nev	35	Feb. 9	Mar. 16	April 5	.50
American, Nev	1	Jan. 31	Mar. 8	Mar. 31	.05
Andes, Nev	31	Jan. 24	Mar. 3	Mar. 23	.25
Benton Cons., Nev	17	Jan. 28	Mar. 4	Mar. 24	.25
Bodie, Cal	6	Jan. 24	Feb. 28	Mar. 28	.50
Bullion, Nev	32	Jan. 22	Mar. 1	Mar. 17	.40
Cambria, Cal	2	Jan. 17	Feb. 21	Mar. 16	.40
Camp Creek Placer, Cal	1	Jan. 20	Mar. 10	Apl. 14	.10
Golden Fleece, Cal	8	Jan. 27	Mar. 8	Mar. 28	.10
Hazard, Cal	1	Jan. 26	Mar. 1	Mar. 22	.03
Hubert Concentrator, Cal	1	Jan. 17	Feb. 20	Mar. 14	.10
Keokuk, Dak	3	Dec. 20	*Mar. 1	*Apl. 1	¼
Kincaid Flat, Cal	...	Jan. 5	Feb. 14	Mar. 7	2.00
Lady Washington, Nev	6	Jan. 28	Mar. 7	Mar. 28	.25
Lone Jack, Cal	1	Jan. 27	Mar. 7	Mar. 28	.05
Manhattan, Nev	4	Feb. 2	Mar. 7	Mar. 22	1.00
May Flower, Cal	34	Jan. 19	Feb. 28	Mar. 18	.25
Mexican, Nev	33	Jan. 4	Feb. 9	Mar. 2	.25
Navajo, Nev	16	Jan. 7	Feb. 10	Mar. 3	.25
Nevada Queen, Nev	1	Jan. 4	Feb. 8	Mar. 3	.30
North Belle Isle, Nev	11	Jan. 12	Feb. 15	Mar. 9	.50
North Comstock, Nev	....	Jan. 14	.....	.....	.10
Occidental, Nev	8	Feb. 3	Mar. 10	Mar. 31	.40
Phœnix Cons., Cal	2	Jan. 26	Mar. 5	Mar. 28	1.40
Pneumatic, Cal	2	Jan. 4	Feb. 14	Mar. 8	.20
Sampson, Utah	....	Dec. 17	Jan. 31	Feb. 28	.25
Sierra Nevada, Nev	87	Jan. 4	Feb. 9	Mar. 1	.25
Silver Eagle, Nev	1	Jan. 18	Feb. 18	Mar. 21	.05
Utah, Nev	...	Jan. 25	.....	.....	.50
West Galena, Dak	5	June 5	*Jan 29	*Feb 19	¼

*The delinquent day and the day of sale were postponed to dates given above

Pipe Line Certificates.

Messrs. Watson & Gibson, brokers, 49 Broadway, report as follows for the week:

The market last Saturday and Monday hung in a listless way around 63, but on Tuesday broke to 60¾, and on Wednesday to 60. Thursday, the market was dull between 60½ and 61⅝, the closing figure. To-night the market closed at 60⅝, and looked very tired. Taylorstown is about 8 miles west of Washington district. For nearly a year there has been one good producing well there, yet the development of the territory has been delayed at the pleasure of the two companies who own the territory. Within the past week two new wells were completed there, one moderately small, the other promising to be large. Late this afternoon it made 50 barrels in thre hours.

The pool at Reibold, in Butler County, Pennsylvania, has found a good many big wells within the last ten days, and its production is now about 8500 barrels. This increased output, fears of Lima and Findlay, Ohio, and public indifference, all told against prices.

The following table gives the quotations and sales at the Consolidated Stock and Petroleum Exchange:

	Opening.	Highest.	Lowest.	Closing.	Sales.
Feb. 12	63⅛c.	63⅞c	63¼c.	63⅛c.	996,000
14	63⅛	63⅛	62⅛	62⅝	1,337,000
15	62⅝	62⅝	60¾	60⅞	3,323,000
16	60⅝	61¾	60	61⅛	2,682,000
17	61⅛	61⅞	60⅛	61⅛	2,096,000
18	61⅛	61⅛	60⅛	60⅝	2,566,000
Total sales in barrels					13,000,000

Gogebic Iron Stocks.

The market in the Gogebic stocks continues strong. The dealings show greater activity, at prices named in the accompanying table, and in some instances showed a slight advance, with indications of a higher movement. A great deal of discretion should be exercised in dealings, and when the investment is important, an examination of the mines should be made by disinterested experts.

These stocks, which have until recently only been dealt in at the Range, Milwaukee, Chicago, and Cleveland, will now also have a market in New York, and for this purpose the New York and Gogebic Investment Company has been organized in this city, with a capital stock of $200,000. George P. Shelden, President; W. W. Flannagan, Treasurer; W. B. Scott, Secretary; and Rollin N. Hazzard and Geo. H. Kendall. The business of this company will be that of buying and selling stocks in the most reputable mines on the Gogebic range. The offices of the company are at 140 Nassau street.

Name.	No. of shares.	Par value.	Present value.
Aurora	40,000	$25.00	$50.00
Anvil	40,000	25.00	6.00
Amazon	40,000	25.00	4.00
Ashland	40,000	25.00	32.00
Agogebic	40,000	25 00	2.00
Atlantic	40,000	25.00	7.00
Bonnie	40,000	25.00	10.00
Blue Jacket	40,000	25.00	10.00
Black River (fee)	20,000	25.00	20.00
Bessemer	20,000	25.00	10.00
Brotherton	80,000	25.00	5.50
Bourne	40,000	25.00	4.25
Crown Point	100,000	25.00	2.00
Caledonia	40,000	25.00	3.25
Colby (See Penokee & G. D. Co.)	.....	.....	.....
Emma	40,000	25.00	3.25
Father Hennepin (Kennon)	40,000	25.00	3.00
First National (and Old Geneva)	80,000	25.00	7.50
Germania	40,000	25.00	13.00
Gogebic Iron Syndicate	200,000	25.00	4.75
Gogebic Realty and Iron Co. (fee)	40,000	25.00	5.00
Gogebic	40,000	25.00	3.15
Iron King	40,000	25.00	17.50
Ironton	40,000	25.00	12.00
Iron Prince	40,000	25.00	4.00
Ironsides	40,000	25.00	4.00
Iron Chief	40,000	25.00	6.00
Kakagon	40,000	25.00	13.00
Laura	40,000	25.00	3.00
Lottie	20,000	25.00	.....
Montreal	20,000	25.00	27.00
Moore	40,000	25.00	4.00
Minnewawa	40,000	25.00	5.00
Mayflower	40,000	25.00	1.00
Nimikon	40,000	25.00	10.00
Northern Chief (fee)	30,000	100.00	100.00
Norway	20,000	25.00	.....
Norrie	30,000	25.00	30.00
Odanah (disputed) Puggawagan	20,000	25.00	9.50
Old Nokomis	40,000	25.00	2.00
Pabst	250	100.00	.....
Puritan	40,000	25.00	20.00
Pence & Snyder Iron Dev. Co	100,000	25.00	5.00
Pence	40,000	25.00	5.00
Penokee & Gogebic Dev. Co	5 000	100.00	400.00
Ryan	40,000	25.00	6.00
Superior	100,000	10.00	3.00
Section 33 Co	20,000	25.00	8.50
Sunday Lake	40,000	25.00	7.00
Snider	40,000	25.00	5.00
Trimble	40,000	25.00	8.00
Tontine	40,000	25.00	5.00
Union	40,000	25.00	3.50
Valley	120,000	25.00	5.00

Pittsburg Stock Quotations.

Feb. 16.

Company.	H.	L.	Closing.
Alleghany Heating Company	$112	$112	$112
Bridgewater Gas Company	120	116½	120
Chartiers Block Coal Company	40	40	40
Chartiers Valley Gas Company	93	90	91
Forest Oil Company	.....	.....	.....
Hazelwood Oil Company	.....	.....	.....
La Noira Mining Company	.....	.....	.....
Natural Gas Company of West Va	99	97	98½
New York & Clevela'd Gas Coal Co	48½	47	48
Philadelphia Company	56½	53½	54
Pennsylvania Gas Company	.....	.....	.....
Silverton Mining Company	.....	.....	.....
Westinghouse Air-Brake Co	99	99	99
Westinghouse Electric Company	100	99	99
Wheeling Natural Gas Company	46½	46	46½
Yankee Girl Mining Company	7	7	7

Highest and lowest prices during the week.

Boston Copper and Silver Stocks.

[From our Special Correspondent.]

BOSTON, Feb. 17.

The market for copper stocks continues to rule dull, and prices show no material change as a rule. Although Calumet & Hecla has advanced on small dealings from $212¼ to $215, while Tamarack shows a decline from $96⅛ to $95, there is no speculative activity, and the few orders in the market are readily supplied; but at the same time there is no pressure to sell them at present prices, and any large orders to buy could not be filled without advancing quotations materially. Franklin is dull, with sales at $13@$12⅝. Quincy sold at $52, a decline of $1¼ from last week. Osceola is quite strong. The report of the company published this week is considered very favorable, and has created a little demand for investment at $22¼@$22⅛. Allouez sold at $2; National at $1; Pewabic at $2¼—about 500 shares all told, while the balance of the list is neglected, and although bids are made for some of them, they fail to bring out the stock. Huron is $1¾ bid, $2 asked, and no recorded sale for several weeks.

In silver stocks, Bonanza is slightly firmer, with sales at $1⅝ against $1⅛ last week. Boston & Montana declined from $4 to $3½. Catalpa was reported as sold at 37½c. at the Boston Exchange, while at the Mining Exchange it was offered at 33c., and Dunkin sold at 30c., when 35c. was bid freely for it at the Mining Exchange. Bowman Silver mining took a little start to-day, and advanced to 10c. "Cusi" was offered at 40c., 37½c. being best bid. Breece is wanted at 42½c. bid, and Crescent at 11c. bid.

OFFICE ONTARIO SILVER MINING COMPANY, MILLS BUILDING, 15 BROAD STREET,
NEW YORK, Feb. 18, 1887.

DIVIDEND NO. 129.

The Regular Monthly Dividend of FIFTY CENTS per share has been declared for January, payable at the office of the company, San Francisco, or at the Transfer-Agency in New York, on the 28th inst. Transfer-books close on the 23d.

LOUNSBERY & CO., Transfer-Agents.

THE PHŒNIX MINE.

Reprinting the query of C. E. H. and an answer thereto in *Financial and Mining Record*, of the 29th of January, 1887, the newspaper nearest the mine, the Phœnix *Herald*, took occasion to append some comments which we republish below as due to our readers:

"The foregoing from the queries and answers of the *F. & M. Record* is decidedly detrimental to the mining interests of this locality. The facts are these: The Phœnix mine is situated on Cave Creek, in Maricopa County, and distant thirty-five miles north of Phœnix. It is a well developed mine, the assertion that 'the work done on it hardly amounts to serious prospecting,' to the contrary, notwithstanding. All reports, expert and practical, agree that there are tens of thousands of tons of rich free-milling gold ore in sight. The result of five experts' examinations is that a 100-stamp mill has been ordered in San Francisco, and will be erected at an early day. The *Herald* does not care a straw about the price of the stock among the gamblers of Wall street, but it does care for the good reputation of one of Arizona's best mines."

St. Louis Mining Stocks. Feb. 16.

[From our Special Correspondent.]

This week has been quite an exciting one in mining circles, and although actual trades have not been numerous or extensive, the fact that the old standby, "Granite Mountain mining stock" had at last, to a certain extent at least, joined in the general decline, was enough to create a flurry, such as has not been witnessed for more than a year. Granite, which, as reported last week, was firm although dull at $65@$66, suddenly declined on Friday to $55, without any appreciable cause, and on Saturday some small lots sold as low as $51. The news from the mine was as good as ever, and there was no one who could explain why it was "thus." This causeless panic, under which, however, not more than 1000 shares stock changed hands, exhausted itself within three days, and the change for the better was just as sudden as the decline had been. This was aided to a considerable extent by the bullion shipment of the week of $65,400, and every body was crazy to buy the stock again without finding sellers. From $52, the closing price on Saturday, the price has been steadily advancing, until to-day $65 is freely bid, with no sellers below $67½, the actual result of the panic having been to strengthen the market, create a new demand for the shares, and open the way for a substantial advance hereafter. A telegram received to-day from President Rumsey, who has been visiting the mine, says: "Mine looking better than ever; mill produces $10,500 a day." All other stocks have been comparatively dull, with the usual fluctuations. Hope stock was very firm, and the advices from the mine indicate a large supply of good milling ore in sight and consequently an early resumption of dividend.

COMPANY.	Location.	Bid.	Asked.
Adams, s. L	Colo.	$2.25	$2.50
Bi-Metallic, s	Mont.	.....	.....
Bremen	N. Mex	1.10	1.50
Cen. Continental, G. s.	Ark.	.....	.....
Cleveland	Colo.	17½	.20
Consolidated Silver, s.	Mo.	.....	.....
Courtland	Colo.	.20	.40
Dandy, s.	Colo.	.....	.....
Durango, T.	Mex.	.....	.....
Grand Duke	Colo.	.....	.....
Granite Mountain, s.	Mont.	65.00	67.50
Hope, s	Mont.	*4.80	*4.90
Ideal, s. L	Colo.	.30	.35
Iron Gold and Silver	N. Mex	.....	.07½
Laclede	N. Mex.	.03	.05
Peacock	N. Mex.	1.25	1.75
Puritan	Colo.	.....	.....
Quincy	Colo.	.....	.05
Sheridan	N. M.	.20	.25
Small Hopes Cons., s. L.	Colo.	8.50	9.00
St. Louis & Mex. Imp.	Mex	1.40	1.50
St. Louis & San Fran.	Mex.	.....	.....
St. Louis & Sonora, G. s.	Mex	.....	.20
St. Louis & St. Elmo.	Colo.	.....	.40
St. Louis & Yavapai	Ariz	.80	.90
West Granite, s	Mont.	.....	.....

* New stock. Par value, $10.

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IN PRESS.

AMERICAN METHODS OF COPPER SMELTING

By DR. E. D. PETERS.

This is the best work on Copper Smelting in the language, and no Metallurgist, Engineer, Student, or Smelter can afford to be without it.

The work has been revised, enlarged, improved, and brought up to date since its appearance in the ENGINEERING AND MINING JOURNAL. The following are the opinions of some leading Metallurgists upon this important work:

DR. RICHTER, Professor of Metallurgy at Freiberg, Saxony, says: "I am delighted to hear that the articles on American Methods of Copper Smelting, which have appeared in the ENGINEERING AND MINING JOURNAL, 1885-86, will shortly appear in book form. The enormous progress made in Copper Smelting in the United States will make this book of great value to the profession."

MR. F. M. BARNES, Manager of Gustav Chaudoir & Co., Copper, Brass, and Zinc-Works, Simmering, near Vienna, Austria, says: "I consider Peters's book the best work published in any language since Percy's original work appeared."

MR. H. M. HOWE, the well-known Metallurgist, says: "Every one engaged or interested in Copper Smelting should read Dr. Peters's work on that subject."

MR. JAMES E. MILLS, of Quincy, Cal., says: "This treatise presents in detail the late advances in practice and gives a mass of information of a kind usually kept in unpublished notes of the metallurgist or left to the lore of craftsmen; just the kind that makes the least show of great learning is the best evidence of practical knowledge and skill, and is eagerly sought by the metallurgist having work in hand."

THE SCIENTIFIC PUBLISHING COMPANY, Publishers,
P.O. Box 1833. 27 PARK PLACE, NEW YORK.

PRICE, $4.00.

"Phœnix, of Arizona."

PROFESSOR MAYNARD EXAMINES THE GOLD MINE AND GIVES HIS OPINION OF IT.

The reputation of Prof. George W. Maynard, the mining engineer, has been for many years widespread among scientists. He is one of the many experts who have examined the Phœnix gold mine, which is reported to be a huge bonanza, and the stock of which is more widely speculated in than any other mining stock on the market for years. Inquiries are daily received for information in regard to the Phœnix mine. Professor Maynard has but recently returned from the property, and was found by a reporter at his office, No. 35 Broadway. Professor Maynard is a well-preserved, active man, about 45 years of age, exceedingly reserved and self-contained, and would be called in mining parlance a "cold-nosed bear." His words, while few, are to the point.

Mr. Maynard expressed his dislike of being interviewed on the Phœnix mine, particularly as the stock was so very active; but, of course, he would not hesitate to give his opinion if it would really be an accommodation to the public.

He said that he had examined the mine carefully in company with Mr. Fletcher, State Assayer of Massachusetts. He had formed a favorable opinion of the property, but had written a report on it which he intended for several reasons to be very conservative, and chiefly because he had been advised by friends that certain reckless speculators and manipulators were running a big "deal" in the Phœnix stock. He had taken unusual precautions with his sampling of the ore, and with his assays, which were made with Mr. Beebe at the School of Mines of Columbia College, taking precautions against any particles of free gold getting into them, and making triplicate assays as checks.

He had found twenty-three feet averaged $12.30 per ton free gold in a vein over 100 feet wide, with perhaps several other good pay streaks through it, which could only be safely proved when the mill is running. The vein was certainly very large, with every promise of permanence in depth and an amount of stoping ground seldom seen. He had recommended the erection of a 50-stamp mill to begin with, and believes it will pay $250,000 per annum profit. Of course, more stamps could be added as the mine was opened up sufficiently to warrant it.

He had seen few veins of such magnitude bearing gold. As development work progressed the value of the mine would be likely to increase very largely. Of course, this was a chance that all mines must take, but he really thought that the chances of enhanced value at the Phœnix mine were exceedingly good. He had known few as promising properties put upon the market any where, and perhaps, after the Wall street men had made their deal and sold out, Colonel Jemison and his friends, who were in to work the mine legitimately, as he understood it, would make more money in the end than they. He thought the Wall street men too anxious.

As for himself, he would like to open up the mine and put up the mill and take the gold out of the rock. There had been some talk of making him consulting engineer of the company; in which case he would try to show results alike gratifying to speculators and investors. He would be disappointed if a mine with such possibilities were allowed to kick about Wall street and not be properl worked.

NOTICE TO CONTRACTORS AND MINERS.

THE TENNESSEE COAL, IRON, AND RAILROAD CO. is prepared to contract with responsible firm or person for the raising 1000 to 1500 tons per day of Iron Ore at its mines near Birmingham, Ala., for a period of five, ten, or fifteen years. The ore is red fossiliferous hematite, deposed horizontally and upthrown at an angle of about 25 degrees, and outcrops for several miles on the top of a ridge. At the present workings, it averages 22 feet in thickness where undisturbed. The ore is soft for a distance of about 300 feet in from the outcrop and then becomes hard. The contractor will be required to furnish equal quantities of the hard and soft ore. Tracks for loading will be put in by the Tennessee Coal, Iron, and Railroad Co. at such point or points as may be required for convenience in loading. Coal can be supplied to the contractor for machinery at $1.25 a ton at Birmingham, and unskilled labor can now be had for $1 a day. Payments will be made monthly, in cash. Contractor will be required to give good bond for faithful performance of contract and bid f.o.b. cars at mines.

For further particulars, apply to

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SPECIAL NOTICES.

FREE ADVERTISING.

Inquiries from employers in want of Superintendents, Engineers, Metallurgists, Chemists, Mine or Furnace Foremen, or other assistance of this character, will be inserted in this column WITHOUT CHARGE.

The labor and expense involved in ascertaining what positions are open, in gratuitously advertising them and in attending to the correspondence of applicants, are incurred in the interest and for the *exclusive* benefit of *subscribers* to the ENGINEERING AND MINING JOURNAL.

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164 WANTED—A FIRST-CLASS TUNNELman, capable of taking charge of a shaft and headings, with a perfect familiarity with drilling machines and the handling and timbering of heavy ground. Address, with particulars, SHAFT,
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Care of ENGINEERING AND MINING JOURNAL.

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170 WANTED—BY A MANUFACTURING Company, a mechanical engineer, qualified to hold the position with a railroad company of Superintendent of motive power and machinery. Address, with particulars, references, and salary expected, RAILROAD,
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172 WANTED—SEVERAL FIRST-CLASS Machinists and Lathe Hands. Address LATHE,
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Care of ENGINEERING AND MINING JOURNAL.

176 WANTED—A DRAUGHTSMAN. Address IRON-WORKS,
Care of ENGINEERING AND MINING JOURNAL.

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SITUATION WANTED—YOUNG MAN WHO has had five years' practical experience in the machine-shop, and in crushing, concentrating, roasting, chlorination, and assaying gold ores, desires position as assistant superintendent or foreman of any department. *Chance to rise more important than large salary.* Excellent references. J. E. R.,
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A CHEMIST OF HIGH STANDING AND long and varied practical experience will accept situation as chemical adviser or director of any chemical manufacturing operation, at a very moderate salary. Address CHEMICAL EXPERT,
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Care of ENGINEERING AND MINING JOURNAL.

MEETINGS.

OFFICE OF IRON SILVER MINING COMPANY, 23 BROAD STREET,
NEW YORK, Feb. 9, 1887.

The annual meeting of stockholders of this Company, for the purpose of electing Trustees to serve for the ensuing year and for the transaction of such other business as may come before the meeting, will be held at this office, WEDNESDAY, March 2d, 1887, at 12 o'clock. Polls close at 1 o'clock P.M. Transfer-books will close February 24th, at 3 o'clock and reopen March 4th.
HOMER A. HOIT, Secretary.

WANTED—TO PURCHASE AN INTEREST IN MANUFACTURING BUSINESS.—A chemist and metallurgist who has experience in blast-furnace and foundry work, and in chemical manufacturing, would like a position where he could find professional employment and invest a certain amount of capital. Address INTEREST,
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DIVIDENDS.

PLYMOUTH CONSOLIDATED GOLD MINING COMPANY, 23 NASSAU STREET,
NEW YORK, Jan. 13, 1887.
DIVIDEND NO. 45.

The Board of Trustees have declared a dividend of TWENTY-FIVE THOUSAND DOLLARS, the same being *twenty-five cents* per share of the capital stock of the company, payable on the 5th day of February, at the Company's offices in New York and San Francisco.
W. VAN NORDEN, President.

OFFICE HOMESTAKE MINING COMPANY, MILLS BUILDING, 15 BROAD STREET,
NEW YORK, Feb. 16, 1887.
DIVIDEND NO. 103.

The Regular Monthly Dividend—TWENTY CENTS per Share—has been declared for January, payable at office of the company, San Francisco, or at the Transfer-Agency in New York, on the 25th inst. Transfer-Books close on the 19th.
LOUNSBERY & CO., Transfer-Agents.

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GENTLEMEN: After the most severe tests on our ore I have pleasure in stating that the six Duncan Concentrators handle the whole product of our 20-stamp mill with the greatest ease, saving the sulphurets up to 98 per cent., and leaving in the tailings—as ascertained by daily tests—but a trace of gold.

We were induced to try the Golden Gate, upon representation that it was superior to the Duncan, but after giving it a fair trial were unable to save with it more than about 65 per cent., and have therefore been obliged to throw it out.

Our sulphurets are most difficult to handle, from the fact that our ore slimes badly. Though using only 30 mesh screen on the batteries, most of the pulp is fine enough to go through 100 mesh.

My experience goes to show that the less in most milling operations is in the slimes, and that is where all other machines fail, but where the Duncan does its best work.

I am, gentlemen, very respectfully yours,
FRED. W. DAY, Superintendent.

Circulars, prices, and other information can be obtained of the Pacific Iron Works, No. 127 First street, San Francisco, Cal.; 100 North Clinton street, Chicago; or 145 Broadway, New York City.

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